# University Chronicle

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## McKINLEY MEMORIAL SERVICES.

On Thursday morning, September 19, the churches and the people of Berkeley united with the University in a memorial meeting in honor of President McKinley.\* The addresses on that occasion were made by Benj. Ide Wheeler, President of the University, Rev. C. K. Jenness, pastor of Trinity Methodist Episcopal Church, and Rev. George B. Hatch, pastor of the Berkeley First Congregational Church.

### ADDRESS OF PRESIDENT WHEELER.

We are assembled here as members of the richest. freest, most progressive nation that is or ever has been upon the earth, and we are come to mourn the loss of our great father and head, who was the kindliest, the wisest, the most beloved of men. Here by the shores of the Western Sea are we assembled: but up through the mountains, over the plains, down the vast stretches of the valley-land, and along the far eastern shores, in city and hamlet, North and South, East and West, everywhere over the great land, are to-day assembled the fellow-members of our noble bond, blending with ours the voice of their lament. Again has the ardor of a great public grief fused all our loves into one common loyalty; again has the bearing of a common pain blurred the lines of party and creed, section and race, and piled higher that hid treasure of loss which, as a commonwealth beyond the veil, binds us in kinship and unity.

<sup>\*</sup> University CHRONICLE, Vol. IV, No. 4.

Our fields bring forth abundantly, our looms and furnaces hurry to the world's demand, our commerce fills the seas, our marts drop fatness; but it avails us nothing.

Enlightenment abounds; everywhere the shadows of ignorance retreat; in every community the school-house, the library, the church stand open-doored, active to humanize, inform, and uplift; science and its researches are unfettered; the arts of beauty and the arts of use thrive and spread; life grows fuller, richer, sunnier, and, shaking itself ever freer from the dull necessities, rises into scope and outlook; opportunity is free and effort counts, and individual men can shape their fate as never has been in all the days of man. But all this has availed us nothing.

Our government is founded on fullest recognition of the rights of individual man, its authority is exercised according to the law within, more than by the external law of edicts, a free suffrage consults directly the choices of the people, and with an optimism and confidence unparalleled in history makes order the simple expression of the people's will. But this avails us nothing. All of these things have availed nothing. Power, enlightenment, freedom, all of them have not availed to shield our first and best-beloved. The emblems of our wealth and power we robe to-day in sackcloth. Our flag, symbol and guarantee of human rights and level justice, bows its head, and we of the land sit ourselves down beneath it in the dust, a stricken people, overwhelmed in helpless grief; dismayed, confounded, unconsoled.

Of all the men who ever sat in the chair of high authority, none has come nearer to a true understanding of the people's will than this man whose death we mourn to-day; none was more faithful to execute it. The source of his power to know his people must, I think, be identified with his rare endowment of human sympathy. He was naturally and spontaneously interested in his fellow-men, and that singly quite as well as collectively. It was no burden to him to give any plain man a hearing. He attended closely

to what he said, grasped unerringly and almost instinctively his point of view, saw it as he saw it, put himself in his place, felt himself like environed and like circumstanced, saw through his eyes. This was so with every one he met. high and low. He was easy of access; men talked freely with him, because he showed interest in them; he gathered from them not crude information merely, but that priceless thing, the point of view. This is what we mean by human sympathy, and it was through his exquisite and abounding sympathy with men that he came to know the mind of his people, and, finer still, to feel with it its instincts and ideals. Men often chafed at his conservatism and what seemed his slowness in formulating policies or initiating summary action, but again and again the issue has shown that those who counseled haste and were sure to their own satisfaction, and even violently sure of the course to be pursued, conceived their certitude from a vantage-ground that allowed but one of many points of view. Taking many things into account, many things learned through sympathetic communion with many minds, -Mr. McKinley was guided by his peculiar sanity of judgment into courses of action characterized in the most eminent degree by that fine quality we term wisdom. His ability to see things as others see them, and accurately to estimate the real conditions under which another holds a certain view, endowed him with rare skill in seeking out a common standing-ground for men and factions of apparently discordant and irreconcilable opinions. The commonest reason why men fail to agree is found in their failure to understand each other, and the peace-making of the peacemaker who can make them understand each other is no small part, though a frequently underestimated part, of the highest statesmanship.

It was again because he could understand them, that men came to have such unbounded personal confidence in him and such love for him. Sympathy is far harder to find in this cold world than bread or shelter, and when men found it, as hundreds and thousands did in this man who coupled therewith a faith in the noble and the good, they came to do as men must always do, they trusted him, they followed him, they loved him.

So it was that the weight of his influence bore always and everywhere toward the annulling of strife and faction and the establishment of cooperation. He brought unity and accord into the cliques and factions of his party; he replaced the checks and barriers between the different departments of the government with fortunate coöperation born of kindly mutual understanding; and finally, his second administration was rapidly leading toward an erasure of party lines, in that his policies were coming more and more to be the policies of the nation rather than of party. With his last great address delivered at Buffalo just before his death I surely believe he led us to the very door of another "era of good feeling" in which party lines should fade away and party policies blend in national.

He was a friend of man and a friend of men. To no suffering, to no injustice was he indifferent, to no cry of need, to no call for help, to no claim for hearing was he deaf. He spake evil of no man. He showed mercy unto thousands. No hand of a child was ever raised toward him that he did not heed. Toward women he was knightly. His home and his devotion to the companion of his life have set a standard of confirming and purifying influence

in the midst of American society.

He is gone from among us. His public acts and policies have passed to their long hearing before the grave tribunal of history. There we leave them. We know he was a man who loved his country, who gave himself unstintingly to its service. We know that under his rule the land prospered, that the nation entered upon larger tasks which opened before it, and gained for itself and the principles upon which it was founded a larger hearing in the courts of the world. But to-day it is the man himself who is in our thought, and we know that in him we and all humanity have lost a friend.

Farewell. Ave atque vale, brave soldier, good citizen, wise magistrate, God-fearing man, kind friend, beloved father of thy people.

#### ADDRESS BY REV. C. K. JENNESS.

To-day the sound of traffic is low and mourners go about all our streets. We, that blundering, bargaining, frolicloving people, keep the solemn holiday of mourning around that open grave. Wistfully we gather ourselves together, hoping to find some one who will voice for us the eloquence of our emotion, but our grief is very near and very real, and we have only the few incoherent words of real sorrow.

I remember seeing a picture called "The First Sorrow"—Adam and Eve sitting together, while across their knees lies the body of their murdered son Abel, and the tender Eve droops her head, bowing low in her sorrow, and the strong Adam lays his hand in miserable silence over his heart. And as it was in the beginning, thus it is still among the children of men. Our murdered dead lies in our lap, he who is cut off in the midst of high service, taken from the glory of usefulness, and we sorrow not with the eloquence of words, but with the eloquence of tears.

Many of us here mourn with a double sorrow, for we have lost not only our President, but him whom we call a brother in the service of our God as well. I have been asked to speak of the religious faith and attitude of our dead President. Yesterday, when this request reached me, I was seated with Bishop McCabe, who for forty years has counted William McKinley a personal friend, and who was so moved at the news of his death that he was prostrated, unable to meet his appointments to lecture and preach. And I said to Bishop McCabe; "You knew our President well. Tell me what to say of his religious faith" And the Bishop responded: "I can't tell you what to say, but this I know: The President was a man of prayer; regularly on

Sunday he was to be found at church. He had a special fondness and reverence for the sacrament." In purity and sincerity he partook of the symbols of the Great Sacrifice. and when the assassin's bullet stripped him of all those things which surround a great ruler, and he was simply a dying man, it became manifest in the eyes of all the world that he had been with Him who is meek and lowly in heart. Long ago there was One who prayed as they drove the nails through His hands, "Forgive them, for they know not what they do." To-day we recognize the same spirit in him who as the bullet pierced his body cried out to the angry crowd who would have tramped down his assassin. "Let no one hurt him." Long ago there was One who. taken from the midst of a great work, was yet able, out of agony and wrestling, to say, "Thy will be done." To-day we recognize the same spirit in him who with his ebbing breath whispered, "It is God's way. His will be done." And because he loved his God and served his fellow men, not only with wide patient outlook and strong ability, but also with purity and integrity and humility, the life of William McKinley ranks above that of president or statesman, for he has become one of the saviors of the world, one who, because he is lifted up, draws all men a little nearer to God. He has set every American citizen singing, to-day, "Nearer, my God, to Thee. E'en though it be the cross of death that raiseth me, still all our nation's song shall be, nearer, my God to Thee." To be President is the greatest honor in the gift of the people, but to be a savior is the greatest honor in the gift of God. The life of our President has become a vicarious life; on him who had committed no fault, but rather had rendered good service, was heaped suffering and death.

Those who arraign government and strive to tear down our social organization complain that they are oppressed by the capital which is gained as the result of speculation, that those who govern take advantage for themselves of favored investments. If this is the sin of our strong men, then William McKinley was spotless, for during his presidency he made no investments. Like the poorest laboring man, he contrived to save a little from his wages. He was guiltless; he suffered not for anything that he had done. but because of the work he had been chosen to do. His vicarious death makes to blaze before the eyes of all the people the exceeding sinfulness of sin on the one hand, and on the other hand, the exceeding beauty of forgiveness. the exceeding worth of purity, the exceeding glory of the service of God. The open grave calls to us to put far from us not only falsehood and vice, but to put away from among us bitterness and envy and criticism, for these things we now see to be sins, polluted sources which have brought forth death. That open grave exalts in our eyes the elements of all good character, faithfulness, integrity, forgiveness and tenderness, and, watered by the tears which fall round our President's grave, is growing the inspiration to better manhood, more spotless service, more whole-souled loyalty to our country. Thus shall this death by sin lift the nation a little nearer the attainment of the life of righteousness.

"Blessed are the dead who die in the Lord. They rest from their labors, and their works are following on after them. And God shall wipe away all tears from their eyes; and there shall be no more death, neither sorrow, nor crying, neither shall there be any more pain; for the former things are passed away."

#### ADDRESS BY REV. GEORGE B. HATCH.

Because he was our President, we ought to mourn for him; our whole land ought to bow down in unfeigned grief. Emma Goldman is reported to have said that for the human being, McKinley, she felt some human sympathy; but that for the ruler McKinley she had no sympathy and felt no sorrow: that was the infamous utterance of infamous anarchy. Some of our newspapers, since he became President, have spared no invention that skilled and keen malignity could devise to cast derision upon him as our President and to cause him to appear contemptible in the eyes of the people: such action has been and ever is the infamous action of infamous anarchy.

Against this anarchy I wish here to-day to ery the protest of every righteous and right-seeing citizen. If our people do not know, it is high time that they learned, that there is a divinity which doth hedge a President of this United States.

The elementary principles of citizenship and patriotism are these two: (1) Fear God; (2) Honor the King; or, as Jesus said: "Render unto Caesar the things that are Caesar's; and unto God the things that are God's." Any one, therefore, who is lacking in either of these two principles is so far forth lacking in his patriotism and citizenship; and any force or voice which militates against these two principles is so far forth the force and the voice of anarchy.

Fear God: this is the first and paramount duty of the citizen. Honor the King; render to Caesar the things that are Caesar's: this is the second sacred duty of the citizen. The question is not who or what the man is who is our President; the question is not whether he is of our party or of our policy; whether we voted for him, or against him, or withheld our vote; whether we believe in his wisdom and righteousness, or do not believe in them; our President is still our President, whether by our choice or against our choice; and if there is any righteousness in us or any patriotism in us, we shall honor him and pray for him and do our best to love him as our President, so long as he holds that high and sacred place.

I speak against that accursed and licentious spirit which reverences no authority and which acknowledges itself subject to the majesty of no government, but obeys its own self-will. One great lesson which this nation needs to learn is the lesson that the person, the name, the majesty of its President is sacred—sacred as the flag itself, whose folds at sunset may not touch the deck of our ships as it is hauled down, and whose authority every soldier and sailor must salute—sacred as are the principles of liberty which our fathers won, which our Constitution preserves, and which our President represents. If any man speak a word or lift a finger to fling contempt upon the flag, how swift and hot our anger against him is! If any man or any spirit speak a word, or lift a finger, or print a paper, against the honor and the majesty of our President, our anger should be just as swift and hot; our throats should cry against him, "Let him be anathema!" We should thrust him into the outer darkness whence he came and where he belongs.

For the one reason that our President has been shot; that the sacred majesty of this republic has been dishonored and violated; that the holy of holies of our national temple has been entered and defiled: for this reason above all others, we ought to bow down our souls in sorrow to-day; yet not in the sorrow which brings forth no fruit, but in that sorrow which shall work in our own hearts the righteousness of a purer patriotism and a finer citizenship, and which shall cause the land to be purified of its sins.

He who was our President lies dead. We mourn for him because he was our President; we mourn for him also because he was a good man and a good President.

I am not concerned to say that he was a great man and a great President measured by common standards. Perhaps he was. I think he was. I believe that in the verdict of history he will be found written as one of our greatest men and greatest Presidents, measured by the usual standard. But with that I am not concerned; for that I do not care. In the judgment of truth, it is a small matter indeed, whether, measured by common standards, a man is great or small; for in the judgment of truth the question is whether a man is good, and what the character of his deeds

is, whether good or bad. We mourn our President, because he was a good President and a good man.

There is a standard of greatness with which alone it is worth our while to measure: it is the standard of the Word of Truth; it is this: "He that humbleth himself as this little child, the same is greatest in the Kingdom of Heaven;" and, "He that would be great among you, let him become last of all and servant of all."

No man, whatever his position and achievements, is in any true sense a great man, who does not measure up to this standard of the word of Truth, and is not first of all "humble as a little child," and after that, in his estimation of his office among men, "last of all and servant of all." In the measurement of truth there is one standard for greatness and for goodness; and he who is great is good, and he who is good is so far forth great.

This was the greatness of Abraham Lincoln. This is why Lincoln's name grows more lustrous with the passing years. Very typically, more typically perhaps than any other of our first Americans, he humbled himself as a little child, he accounted himself the servant of all.

This was, though perhaps in a less degree, the greatness of James A. Garfield; or if we want an instance near to hand and warm in all our hearts, it was the greatness of Joseph LeConte.

It is also the greatness of William McKinley. Very conspicuously, very consistently, he showed that spirit of humility, that spirit of service, which together constitute and produce the greatness which passes the judgment of truth, and which blesses and upbuilds the earth. I have revised some of the thoughts I once had concerning his "imperialism," and I now believe that the "imperialism" which was dear to the heart of William McKinley and which he desired for this nation, was the "imperialism" of service, the "imperialism" of doing good. His last speech breathed that spirit, was instinct with that desire; and if our nation can become "imperialistic" according to the

spirit and tenor of that speech, she will be an empress from whose hands good will fall to the remotest barbarian of the earth, and the very hem of whose garment will help to heal the evil of the world.

We mourn to-day a President, a man, great in his goodness; great in his tenderness toward the woman whom God gave him to wife; great in his love of democracy and simplicity; great in the breadth and sincerity of his desires that he and his country might serve humanity and liberty and civilization to the uttermost parts of the earth. And because we mourn for so good a man, therefore there is joy and exultation in our mourning: we are proud of him for whom we mourn; we are sure that his work shall follow him; and that it is of such as him the words were said: "They shall never perish; neither shall any be able to pluck them from my Father's hand."

Lincoln said at Gettysburg: "The dead have done their part; it is for us, the living, to do our part."

The dead have done their part. Except for the deeds of those who are dead, we should have no country, no church, no civilization. The ground on which we tread is level and holy, because its valleys have been filled and its rough places have been made plain by the sacred dust of those who have been this way and who have laid down their lives for us to walk upon. The unfinished fabric of our civilization is builded upon the foundation of the apostles and the prophets. Jesus Christ Himself being the chief corner-stone; and every separate stone, elect and precious, which has gone into the rising walls of this temple, has been some good man or woman, some doer of righteous deeds, who now is dead. To this fabric, another living stone, the head-stone of a conspicuous corner, has now been added; and the character and deeds of William McKinley have made and will continue making their contribution to the strength and the beauty of freedom's sanctuary. He has done his part.

It is for us, the living, to do our part. Let us adopt

the creed of President Roosevelt, and be doers of the word. not hearers only, deceiving our own selves. The Outlook says that President Roosevelt's creed, as expressed in his Minneapolis speech, is "heroic"; and seems to intimate that it is a creed too high for ordinary men. Very well: then let us not be ordinary men any more: but if to suffer our full share of the labor, the sacrifice, the sweat, the dirt, involved in doing the deeds of righteousness and of conscientious citizenship be "heroic," then, in the name of that cross which every true man must daily bear, let us be "heroic." Let us lay down our lives, as others have done, to furnish new and higher ground for the coming generations to walk upon. Let us build ourselves into the fabric of civilization, into the beauty and the strength of freedom's sanctuary; not caring whether our place therein be conspicuous or inconspicuous; caring only that we contribute our full share, little or much, to its beauty and to its strength.

If we, the living, dedicate ourselves "to the great task remaining before us," not loving our lives but even hating them for the sake of that which is worth loving, then "the great task," which has "thus far been so nobly carried on," will not suffer in our hands.

# THE NINTH JUBILEE OF THE UNIVERSITY OF GLASGOW.

By CHARLES MILLS GAYLEY.

The fifteenth century, though mostly occupied with treasons, strifes, and sudden deaths, snatched leisure once in a way for penance; and this perhaps helps to account for the fact that during the century no fewer than twenty universities were founded on the continent and three in Scotland. Of the latter, one was the University of Glasgow. In 1451 Pope Nicholas the Fifth issued a bull for the erection of a studium generale in Scotland; and the little town of Glasgow, then a fishing village clustered around a cathedral, was chosen for the new university "by reason of the healthiness of its climate, the plenty of victuals and of everything needful for the use of man." The victuals and the needfuls (by which latter must be meant the wee snacks of the "water of life") are still "plenty," and so is the climate, but for its quality the present writer cannot say much.

The course in the new university was modeled upon that of Bologna; and with all the privileges of the older the younger was endowed; but with nothing else, for, as the historian declares, "it came into the world as naked as any individual." We find, in the Liber Saecularis Glasguensium, that, at first, the college was installed in an old building in the Rotten Row—the ruins of which, known as the "auld pedagogy", were still to be seen in the last century. "Nine years afterwards Lord Hamilton bequeathed to it four acres of land in Dovehill and a tenement in the

street leading down from the cathedral to the Market Cross, near the Place of the Dominican Friars. There, on what became the High Street, where a new College was to be built, the masters and students took up their quarters. In recompense for this pious gift the donor required that twice a day, after meals, the masters and students should rise and pray for his soul, and for that of his spouse, Euphemia; for in those days pious founders who lent to the Lord exacted very high interest. The College held its convocation in the cathedral"; -the stately old St. Mungo's of to-day-"and meetings of the students in the dark crypt at the altar of St. Nicholas, where they chose a rector by a majority of 'nations.' For as the great European universities divided students into 'nations,' since scholars came from many countries to study, so did this poor pedagogium, though the 'nations' were only students from different districts of Scotland.

"Then came the Reformation; away fled Popish churchmen, students, and masters, and when we see the august University once more all that is left of it are twelve individuals: a principal, three regents, four poor students, the principal's servant, an oeconomus, a cook, and a janitor. To such a miserable remnant are the functions and privileges left, with a meagre revenue of £25 yearly. From St. Andrews in 1574 came that stalwart reformer and universal scholar, Andrew Melville, who had lectured at Paris, Poictiers, and Geneva, and he constituted the whole teaching staff in himself, lecturing on Greek (when very few protestant clergy in Scotland could read the New Testament in the original), on Hebrew, Chaldee, Syriac, prelecting on scholastic philosophy, on physics, on logic, rhetoric, chirology—in a course which lasted for six years.

"The College life went on the same throughout the 17th century, whether presbytery or prelacy had the upper hand. Accommodation was hard to get in the little town, and the University was anxious to keep a close superintendence over the youths lest any moral evil befall

them. It was, therefore, in chambers within the College that they sought to lodge as many as possible. When the scholar arrived there was given to him the key of his chamber, the accommodation of which was small and its furnishings severely scanty. In a room where four lads were to lodge, there would be two standing beds, a table, four desks or 'studies' with shelves for their books and hard forms for their persons; for all of which there was charged for the session from eight shillings to half-a-crown according to situation on the turnpike stairs. The Faculty being intensely nervous about the safety of the garnishing they gave, a careful inventory was written, and solemn compact made with the occupants to keep their valuable fabric and goods without detriment. Here is a specimen of these curious documents: 'We under-subscryvours, having received the key of chamber 5, plenished with thrie standing beds, thrie studies—the one in the east corner with shelfs. a tabel and a furme, another at the back window with a table and fixed furme and a shelfs, and the thyrd at the fire with a table, a furme and shelfs: a broken lock and key on the first study, with sufficient lockes and kies to the other tuo, a coll house with a broken door, a chimney with whole windows, and ane sufficient lock upon the same chamber door-Doe oblige ourselves to keep the chamber in good care as at this tyme.' (Here follow the numbers of the five under-subscribers.) Should any wilful damage be done, the person 'delated and found guiltie of breaking the glass windows or other detriment' was publicly and ignominiously whipped and extruded from the College. Such was the law since 1667.

"Keys these scholars had, but no privacy, for the most vigilant watch was kept over all their words and doings—not merely by the censor appointed out of their number, who might, or might not, inform the authorities—but by the regent whose charge it was for the week to visit the apartments. At nine o'clock his cautious footsteps were heard creaking up the turnpike stair; he turned the key to

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discover if all were behaving themselves seemly—no cards, dice, no play books; he inquired if they had been careful in secret prayer, for by regulation 'he was to discover what conscience each made of secret devotions morning and evening.' Thereafter, blowing out the tallow candles, he took his departure. At five o'clock next morning the steps of the Hebdomadar-as he was called-again mounted the stairs, to waken the lads and see that all were soberly behaving; and at six o'clock they were summoned by the College bell, which was 'ting-ed' or 'pulsit'-signal for all to meet in the common hall for prayers and praise and reading of Scripture, by the glimmering of candles in cold, dark winter dawn. With empty stomachs the lads went to the classes, listened to the prelections, always in Latin, in which the Regent lectured on Greek or physics or philosophy, till nine o'clock, when again the bell was 'ting-ed' or 'pulsit,' and they flocked into the hall for breakfast. At the upper table sat Principal and Regents in their gowns; at other tables were the divinity students or 'theologues,' and the art students, vaguely called 'philosophers.' At the chief board there was set down a "sup" or soup, of fine wheat bread, and also dry bread and ale; or, on three days of the week, 'fresh caller eggs' and fresh butter. Meanwhile the boarders partook of a soup of oat loaf, 'good and sufficient,' of one lb. weight, to be divided amongst three, with bread and drink; on other three days they had one egg each. At 12 o'clock the bell sounded for dinner, and hungrily they sat down once more. If it be on 'flesh days'-Sunday, Monday, Tuesday and Thursday, the masters had their broth, or skink-a succulent soup made of cow's hams-sodden beef, roast mutton, with wheat bread and 'good stale ale'; which is varied on 'fish days' by kail, a herring, two courses of fish, and a roast of flesh. The boarders, in their turn, dined, on 'flesh days,' on an oat loaf divided into two, a 'taylie,' or lump of beef 'sufficient for four,' which all shared from the same wooden platter and cut up with their own claspknives, but on 'fish days' they luxuriated exceedingly on two eggs and a herring. It is evident that their stomachs were not gorged, neither were their palates pampered.

"When classes ended, at five o'clock, they might go where they pleased, but out of the College they must not pass bearing sword or dagger, for there had been quarrels and assaults, and even murder, which brought grief and scandal on the College. Not a word but Latin must be spoken within the College precincts, not even in play, and to secure obedience to this rule, as well as to that against profane oaths, 'clandestine captors' or censors were chosen out of the 'poorest students,' as most likely to have least dignity or scruples in spying on their comrades; and on the report that any had spoken Scots the offender was to be mulcted of 6d. Scots for every transgression.

"At length supper hour arrived, and once more there was the scramble of scarlet gowns into the hall, The masters were regaled with broth, or skink, roast mutton and a hen; or, on a 'fish day,' they had 'stamped kail,' eggs, some roast flesh and stewed plumdamas—that is damascene plums or damsons,—at all which the Bursars must have looked with envy, as they took their humble fare of 'soppes,' and bread and milk, or a dish of fish 'enough for four,' eaten from one platter, and with the fingers, as no forks were used. Such was the fare, dismally monotonous, far from sumptuous, which was laid in the College Hall."

So much for the animal, now for the intellectual man. "The class-rooms were small and very dark in the dreary winter mornings, with the light of guttering tallow candles. The class was opened with prayer, not by the regent, but by the students, who on successive mornings took their turns. When a youth began to flounder agonisedly in precatory Latin, there was delight unbounded amongst his classmates, and there was pleasing emotion when it fell to the lot of some scapegrace [to agonize]—whose varied accomplishments did not include 'wrestling' in prayer. In

the beginning of the next century the scandal was felt too much, and only sober-minded students were called upon. The regent took his pupils right through the curriculum from the 'bajan' class on to the final or magistrand class. prelecting through three or four years on Greek or mathematics (when there was no special professor for these subjects), on logic, moral philosophy, pneumatics (which included the nature of spirits, angels, and deity), and natural philosophy-aided by very poor apparatus, of which the University was very proud,—a double-barrel pump and a telescope in the highest state of inefficiency. The class-room rang monotonously with the names of Aristotle and Porphyry, or Burgerdicius and Ramus, of Vossius and Puffendorf. This multifarious course took a great deal out of the professor, but put extremely little into the students, and it was a boon both to teacher and scholar when the preposterous system was abolished in 1726 and a special professor was assigned to each branch."

I have quoted thus at length from the *Liber Saecularis* because it will soon be out of print, and Chorley's account which is here embodied is inaccessible to Americans.

The most important events in the history of the University since the arrival of Andrew Melville in 1574 were: first, the nova erectio in 1577, by which James the Sixth prescribed proper rules with regard to the college and made a considerable addition to its funds; second, the removal of the University from the old buildings in High street to the magnificent site on Gilmorehill. In these new buildings the classes of the University met for the first time in 1870-71. There is, I imagine, no finer university location in Great Britain than that enjoyed by the University of Glasgow. The little fishing town of the fifteenth century has now grown to be the second city in Great Britain, with a population of almost a million inhabitants; and the University has grown proportionally. Situated as it is in close, but not too close, proximity to the central marts of

Scotland, it has just such advantages as are most desirable for a seat of learning from which have proceeded, and must proceed, so many of the capitalists and law-givers of the Scottish race.

The University is governed in a much more democratic fashion than our American universities. All graduates of the University have a a voice, directly or indirectly, in the management, and the undergraduates enjoy the privilege of electing the chairman of the University Court, or Board of Regents, as we should call it. Through this officer, the Rector, at present the Earl of Rosebery, the undergraduates have a voice in the management of University revenues, the election and removal of instructors, and the fixing of fees. The Court has, however, nothing to do, except as a Board of Final Appeal, with the arrangements of courses in the University; these are determined by the University Senate, which is presided over by the Principal, whom we should call President, of the University. The formal head of the University is still another functionary, known as Chancellor (now the Earl of Stair), but the Principal, as Vice-Chancellor, discharges most of his few duties.

The students pay a small matriculation fee and a fee equivalent to about fifteen dollars a term for each course elected. Some of these costs may be canceled by means of the income derived from scholarships, but scholarships in Scotch universities have so far not been distributed in the manner of charity, as in some of our American institutions, but as a reward for superior answering in examinations upon entrance or during the academic course. There was, for a time, apprehension lest Andrew Carnegie's recent benefaction of \$500,000 a year to the four Scotch universities might tend to "pauperize" education, but Mr. Carnegie speedily allayed the alarm by placing his scholarships upon such a basis as would ensure their being earned by the students who enjoyed them.

The University is divided into five distinct faculties,—those of Art, Science, Medicine, Law, and Divinity. The

students fall into two bodies,—the Togati, or regular undergraduates in the academic course, and the Non-Togati, or special and professional students. Members of the former body are entitled to wear the ancient academical robe of the University—a scarlet cloak. Women have been admitted since 1892, but they are allowed to hear lectures in the same class-rooms with men only in the honors courses and the courses in political economy, education, and history. On what grounds (other than the personal preference of professors) this distinction is made. I have been unable to discover. The students have a Representative Council, which bears a close resemblance to our organization of the Associated Students. The academic population of the University is at the present time of about the same size as that of the University of California. The course of study is shorter than ours. It covers only five or six months in the year, may be completed in three years, and leads to the degree of Master of Arts. But it must be remembered that most Freshmen of the University of Glasgow are better disciplined in the classics and the modern languages on entrance than are the students entering our state universities, whose scholarship is generally characterized by a smattering of but one subject or an ignorance of both.

The four hundred and fiftieth anniversary of an institution of learning, beside the antiquity of which the years of our most venerable American universities are as childhood, would naturally call together a great number of visitors from institutions of art and science all over the world. On the 12th of June, 1901, some six hundred delegates gathered in Glasgow to honor the University. There were representatives from forty-seven American universities and learned societies, representatives also from the universities of Great Britain, of the continent, from Japan, from the British colonies, from Hindustan,—in fact, from every quarter of the globe. The Glasguensians had made careful provision for their guests and for an excellent series of entertainments: openings of new buildings, conversaziones, garden

parties, evening receptions, banquets, glorious Scotch dances with Highland bagpipes piping, students' torch-light processions, and all such promoters of conviviality. But most impressive were the commemorative service which opened the Jubilee, the presentation of addresses of congratulation, and the conferring of degrees. The commemoration took place in St. Mungo's, -where John Knox had often preached and where Cromwell in his pride had once been rebuked,—and, as the richly robed procession filed into the ancient cathedral and up the aisles, a concourse representative of many fields and of institutions widely separate but pursuing one truth, no man can have looked on without a thrill. The service was gorgeous. Though it was Presbyterian and strictly Genevan, dignitaries of the Anglican church shared in the offices with dignitaries of the established church of Scotland. In the chancel sat the Principal; before him lay the mace that Beaton had carried to France when in 1560 he fled from the Reformation; on either side the stalls were occupied by the Principal of Aberdeen, the Bishop of Ripon, the King's Chaplain and Minister of St. Mungo's and other clergymen. Among the distinguished men who filled the benches were Sir Ian Hamilton, General Sir Archibald Hunter, Lord Balfour of Burleigh, Earl Beauchamp, the aged Marquis of Dufferin, the Earl of Glasgow, Sir Archibald Geikie, the President of the Institute of France, -le Comte de Franqueville, - Andrew Carnegie, Sir James Reid, Sir Henry Roscoe, Professors Jackson and Mayor of Cambridge, Pelham, York Powell, and Provost Monro of Oxford; of our own professors the best known were, probably, President Adams of Wisconsin, Baldwin of Princeton, Seymour of Yale, and Most of these men were "capped" Farlow of Harvard. upon the succeeding day.

One can hardly appreciate what a University as old as Glasgow stands for unless one calls to mind some of the events that have marked the world's history since its establishment. And this the preacher of St. Mungo's on that interesting morning last June asked us to do. I cannot remember all the happenings with which the Reverend Macadam Muir illustrated the antiquity of his University, but I remember well the skill with which he directed our attention to them, and the sentiment of respect for his Alma Mater which was thus awakened, In 1451, when Glasgow University was founded, Constantinople was not yet captured nor the Mazarin Bible yet printed; England was still exercising its nerves over Jack Cade: James II was on the throne of Scotland, and the Ballads of Chevy Chase and Otterbourne were just getting themselves sung. When, in 1501, Glasgow was passing her first milestone of fifty years, the Cape had only recently been rounded. Columbus had within the decade made his great discovery; in Florence they were burning Savonarola, and they were founding St. Peter's in Rome. Just two years later James IV was riding into Edinburgh with Margaret Tudor on the pillion at his back, and Dunbar was singing the nuptials of the Thistle and the Rose. When 1551, the year of Glasgow's second jubilee, was come, Luther's work was done, Calvin was still alive, the Reformation had triumphed in England and Knox was carrying it to a safe conclusion north of the Tweed. By the time of the third jubilee Presbyterianism had been established in Scotland, Mary Queen of Scots had perished and James VI was on the throne: Queen Bess was stepping to her grave; Marlowe and Lyly had come and gone, Shakespeare, in his prime, was writing Hamlet, and Ben Jonson was beginning; Raleigh had planted his colony in Virginia, and the Pilgrim Fathers were easting about for a home where political and religious freedom might be enjoyed. When the fourth period of jubilee was accomplished the Stuarts had reached their climax in England; Dunbar and Worcester had been fought. It was Cromwell's day and Milton's. The New England colonies were growing apace, and the oldest of American universities was thirteen years of age. When Glasgow's fifth year of jubilee arrived, the English Revolution had already taken place, the Scottish dynasty had lost its second chance and the Union of the Kingdoms was at hand. Before the sixth milestone had been passed, Culloden and Preston-pans were fought and the Jacobites silenced. In the America and India of 1751 the French and English yet strove for colonial empire. In Europe Frederick the Great was catching breath between Hohenfriedberg and Lobositz; Kant and Hume, Rousseau and Voltaire were changing the intellectual attitude of country and of school. At the University of Glasgow Adam Smith was teaching, Hutchinson had recently died, and Cullen was lecturing in Chemistry, By the date of the seventh jubilee, Robert Burns had sung and ceased, and his mantle had fallen to Scott; the American Commonwealth had taken its place among the nations of the earth; France had burst into revolution, and Napoleon was First Consul; Nelson had won his victories; so had Clive and Hastings; Seringapatam had fallen, and at the feet of England lay Hindustan. In Glasgow thought grew apace: Reid had succeded Adam Smith, and Black had added to the glories of Cullen's chair. During this seventh period Coleridge and Wordsworth were commencing; the latter had just passed away when the four hundredth year of Glasgow University was celebrated. For the two years just preceding the Rector of the University had been T. B. Macaulay. Sir William Hooker was now widening the bounds of botanical scholarship, and the present Lord Kelvin those of physics. Ramsay was teaching the classes in Humanity: and the day was at hand when the brothers Caird should lend new distinction to the chairs of Divinity and Moral Philosophy. In England, meanwhile, the reign of Victoria was well begun, the interests of international commerce had found expression in the First Great Exhibition, Tennyson was poet laureate, Carlyle was "sermoning," and Thackeray and Dickens were "humoring" the times.

Somewhat thus it was that the University preacher at the opening of the ninth jubilee led us to consider the tracts of time traversed in the career of Glasgow. Similarly, by the address of the stately Principal and Vice-Chancellor. Dr. Story, and by the time-honored functions that attended the conferring of degrees, one was continually reminded of the touch of the present with a tremendous and still living Such occasions refresh the historic sense. Oxford and Cambridge and St. Andrews may, by a saeculum or so, be the elder sisters of Glasgow. Each is graced with historic honors, and, in turn, honored by her children; but none can point to a progeny more useful to the world of learning, conduct, and science than that which has proceeded from the college by the Clyde: -in Theology, practical as well as speculative, Elphinstone, John Major, Melville and Spottiswood, John Knox, the Beatons (Cardinal and Archbishop), Norman Macleod, and the late Archbishop of Canterbury, Archibald Tait; in literature, Henryson, Campbell, Smollet, Boswell, Jeffrey, Lockhart, Pollok, Tom Taylor, John Niehol, Andrew Lang, and many another; in Philosophy, Hutcheson, Reid, Sir William Hamilton, John Caird (the late Principal), and Edward Caird (now Master of Balliol); in the classics, such giants as Buchanan, Ramsay, and Sir Richard Jebb; in Political Economy, Adam Smith; in Science, pure and applied, men like Simson and Maclaurin, the mathematicians, Allen Thomson, Rankine, the father of modern engineering,-Cullen, Black, and Hunter, James Watt and Lord Kelvin; in Medicine, Lord Lister, Sir Hector Cameron, Sir William Gairdner, and William Macewen. It has, in fact, been recently said, with some exaggeration, but still with fair reason, that from the days when Thomas Reid and Adam Smith were professors of Philosophy, every Scotch thinker of eminence, with the exceptions of Hume and Ferrier, has either studied or taught at Glasgow. Glasgow has also its Livingstones of commerce, and of conduct, of administration, and of learning, as well as of travel. No wonder that when an institution like this makes ready to celebrate its flower of four hundred and fifty years, the world is willing to assist.

## THE YALE BICENTENNIAL CELEBRATION.

By THOMAS R. BACON.

The University of California was represented at the Yale Bicentennial Celebration by three delegates. It has therefore seemed proper that some report of the proceedings on that occasion should appear in these pages, and I have been asked to make it. I find it a difficult thing to do, for any adequate description of what took place would fill more space than could be spared. Further, the functions were so numerous and varied, that it would be hard for any one to do justice to them all. The exercises began on Sunday morning with an appropriate sermon in Battell Chapel, and closed late on Wednesday with a general reception to the graduates and visitors. The hours between were full. No judicious person attempted to be present at all of them, but selected beforehand the particular events which it seemed to him he would be best pleased with, and then spent much bitter regret over the fact that he had not been present at the others.

It may be remarked, as a sort of preliminary, that the conduct and administration of affairs was perfect. Every part of the program was carried out with the precision of clock-work, a fact which implied an enormous amount of hard work and foresight on the part of some one. Further, the arrangements for the entertainment of guests and graduates were absolutely complete, and if any one failed to obtain accommodations, it was his own fault.

It is difficult to pick out from so large a number of

events those which are most worthy of notice. It certainly seemed to me that those which made the most impression upon the visiting delegates, who were not particularly well acquainted with the life of Yale, were those which were wholly arranged and carried out by the students and graduates themselves, such as the torch-light procession and the spectacular exhibition on the campus on Tuesday evening. This impression I derived from such visitors in conversation. They seemed somehow to have caught some small glimpse of that "Yale spirit," of which they had heard so much, but in which they scarcely believed.

A report like this, however, should properly concern itself with matters which to many persons seem more serious than torch-light processions and football games. probably to be found in the remarkable series of addresses by distinguished men, which ran through three days, and in the culminating Commemoration Exercises in the Hyperion Theater on Wednesday morning. The addresses were delivered in the Battell Chapel, and were as follows: "Yale in its Relation to Christian Theology and Missions." by Professor George P. Fisher; "Yale in its Relation to Law," by Mr. Thomas Thacher; "Yale in its Relation to Medicine," by Dr. William H. Welch; "Yale in its Relation to the Development of the Country," by President Cyrus Northrup. and "Yale in its Relation to Science and Letters," by President Daniel C. Gilman. The names of the speakers are enough to have made certain the excellence of the addresses, and each seemed to rise to the inspiration of a great occasion.

There was only one drawback to the exercises of Wednesday morning, and that was in the utter inadequacy of the theatre for the accommodation of even those who had a right to be present. If the great University Auditorium, now in process of erection, had been complete, it would not have been large enough, and the largest theater in New Haven was altogether insufficient. None of the classes later than '84 got inside the doors, and, of course, the

undergraduates had no chance at all. They all took part in the august academic procession from Dwight Hall to the theater, a very impressive spectacle. At its head walked the President of the United States and the President of the University, the Governor of the State and the ex-President of the University, and behind them walked more men of high distinction than were ever brought together on such an occasion in the history of the country.

These same men served in themselves to make illustrious the assembly in the theater, and to set off the dignity and splendor of the occasion. The exercises consisted of a poem by Mr. E. C. Stedman, the singing of a Greek ode, an oration by Mr. Justice Brewer of the Supreme Court, and the conferring of the honorary degrees. Everything was excellent of its kind. Perhaps the greatest surprise of the occasion was the Greek ode, written by Professor Goodell and set to music by Professor Parker. Those who know about such things say that the ode is a good ode, and musical critics say that the music is good, but these things might be so and yet the whole thing miss making much impression on the audience. The audience is apt to regard music on such an occasion as a sort of interruption, or recess, in the course of the proceedings. Such was not the case here, and no part of the program made a profounder impression or was listened to with more breathless attention than this.

The interest culminated in the conferring of the honorary degrees. This would necessarily be so, owing to the distinction of the men who received them. But the interest was greatly increased by the method. The President of the University, following precedent, gave briefly the reason why each degree was conferred, and these characterizations of the candidates were so terse and sparkling that dead silence fell on the applauding audience every time the President opened his mouth, and, as he had sixty-one degrees to confer, the whole seemed a surprising feat to those who did not know him.

It is well to say something of the music which came into the program, and which contributed so largely to the success of the celebration. There was hardly a single meeting of which music did not make some part, were it only the singing of a hymn or a college song. And all this music was excellent in its own way. The more formal musical performances were an organ recital in the Battell Chapel on Sunday, Professor Parker's Hora Novissima on Tuesday. the Greek ode already mentioned, and a concert by the Boston Symphony Orchestra on Wednesday. This last was the graceful contribution to a Yale celebration by Mr. Henry L. Higginson, a member of the Corporation of Harvard University. But a mere citation of such examples fails to give any adequate notion of the "music in the air." which gave a distinct flavor to the whole celebration. most amusing illustration of the prevailing harmony was found in the eagerness of the mass of graduates to teach accomplished musicians how a tune ought to be played. The fun was that the graduates were right.

There are two more or less permanent memorials of the celebration. One of them is found in the erection of the "Bicentennial buildings." This architectural group was not complete at the time of the celebration, because of the wise determination of the Corporation that no building should be begun until there was enough money to finish it. The necessary funds for the completion of the group were not in hand until last Commencement day. Yale asked for two millions of dollars and got it. These buildings are four in number: the dining-room, University Hall; the administration building, Woodbridge Hall; the auditorium, Woolsey Hall, and the memorial portico, the entrance to the dining-room and the auditorium, where shall be inscribed the names of those whom their Alma Mater delights to honor. Much criticism was called forth on the publication of the designs of these buildings, because they departed so far from the prevalent "collegiate Gothic" of comparatively older buildings. When the bitterest of the critics saw the result, so far as it went, he had to admit that it was not as bad as he expected. The fact is that a range of buildings, covering three long city blocks, may very well begin at one end with one style of architecture and bring up at the other end with another style, without producing any sense of incongruity. Some educational institutions in America, which I will not name, have erred seriously in following too monotonously an architectural lead. The sins of Yale are not on this side. I have not seen on this continent so noble a group of buildings as Yale can show. I am aware that I do not speak without prejudice.

The other monument of the celebration, to which too little attention has been called, is the long series of volumes, issued under the title of "The Yale Bicentennial Series," which is now in course of publication. It is an attempt to show what Yale is doing in scholarship at the present time. A mere glance at the titles of the several volumes and the names of the authors shows the great and helpful activity of the University in the lines of investigation and scholarly thought. The most widely circulated of these volumes will doubtless be Dr. Hadley's book, "The Education of the American Citizen"; but there are many others, whose educational value is of the best, and which are received by experts as excellent contributions to the world's knowledge. They are not so conspicuous as the new buildings, and they will not so long stay in the public vision, but they will remain to future generations as an evidence of the prodigious intellectual activity, which Yale is sharing with all the leading universities of the land.

It is particularly hard for a Yale man, returning to Alma Mater after many years of absence, under such peculiar circumstances, to give expression to the emotions awakened by the great celebration. I cannot attempt to do so, feeling that silence is more eloquent than speech.

### EDUCATION\*.

By THOS. ADDISON.

If one of you to-day were traveling an obscure mountain pathway that led over rough and rocky ways, where it was often difficult to choose your way aright. I am sure you would welcome the advice and guidance of some old pioneer who had traveled the way before you, and now stood ready to warn you of some of the rocks over which his feet had stumbled, and point out the path that seemed to him to lead to your desired destination. It is in the spirit of the pioneer who has traveled the difficult pathway of life some twenty years in advance of most of you that I appear here to-day in response to the invitation of your honored President to speak a few things I think I do know on the subject of education; and especially of that education that seems to me most desirable for the man of affairs of the present day. And by "education" I mean that instruction and training that qualifies one for the business and duties of life. (Note. please, the double qualification.) I have thought sometimes that among the students of this University there were some who expected to finish their education when they had finished their four years' course. If there are any such here to-day, then my words are not for them. For the education of which I speak is mainly that obtained after you have left college and begun the real work of life that lies before you.

<sup>\*</sup>An address to the students at the University Meeting, November 8,

I do not mean to depreciate in the least the usual academic course. It has great and lasting value, but its value is often misunderstood. In other times I have talked with students of this University on that point, and have been surprised to learn how many expected their general academic course to fit them for some lucrative employment in the business world of to-day. To one with such expectations the usual college course is often a detriment instead of an advantage. The chagrin of failure that usually follows such expectations is always serious, and frequently ruinous. But to one who has his special life work already laid out, and looks upon his general college course as so much foundation to be built upon, then such work is of inestimable benefit, and, no matter what vocation he may pursue, it will make of him a broader, a better, and a more successful man.

I take it that there is no person within the sound of my voice but has in him the desire to win from this world such measure of success as lies in his power. And, therefore, I am not going to occupy your time in generalities, but instead I shall name some specific things that I feel sure make for the success of the individual possessing them in the business life of to-day. And by success I do not mean wholly the acquisition of material things. Money and other material things, as society is constituted, are necessary and desirable, and one may be sucessful and praiseworthy and win much of both. Rightly used, money is a blessing; wrongly used, a curse. But the winning of money alone is not success. The making of money may be "business," but the "duties" of life demand something more: and that "more" reaches out to and includes the duties one owes to his family, his neighbor, his country, and his God. And no man or woman can be considered a success whose education has not in some measure fitted him or her for the fulfilment of all these duties.

The average man of to-day probably has no greater mental capacity than the average man of a thousand years ago, and yet the last century has seen greater advancement in the discovery and utilization of Nature's resources than many centuries previous. This great advancement is undoubtedly due largely to the fact that this is the age of specialization. The wise man no longer spreads his work over a wide area, but centers all his energies and abilities on some one thing, and perhaps discovers new and better methods of doing that one particular thing than ever had been known before. And once a man has reached the point where he can do some one thing better than anyone else, or even better than the average, if that thing is worth the doing, there is no longer any question of his employment. Employers the world over are seeking such men. He is like the trained athelete who has his work cut out for him, knows it thoroughly and can do it; and that means success. And you, if you are going out into the world to compete with that man, must do as he has done; that is, learn to do some one thing well. And what that one thing shall be a matter of early decision. If there is a Freshman here to-day who has not decided on his special life work. then he has not done what he ought to do. If there is a Sophomore, then he is blind to his own best interests. If there is a Junior, then he has already cast aside golden opportunities; and if there is a Senior, then he is negligent of his own welfare and has already thrown aside some of the weapons by which he would win success. For the four years college course can be made a better foundation for the life work if you know at the beginning what that life work is to be. So I repeat, your general academic course does not suffice to fit you for the life work of to-day. As a foundation it is worth-all it costs in time and money, but it should be followed by special training to fit you for your special work. And therefore the first thing I advise is:

Decide on some one thing you intend to do, and learn to do that one thing well.

This is the day and age of superlatives. Many men seem to pride themselves on bringing into use two adjectives where only one existed before, and the result does not give clearness or accuracy of speech. They seem to strive to make up in quantity of speech what they lack in quality. One of the worst and most senseless forms of exaggeration practiced by certain men who lay claim to respectability is the use of profane or indelicate expressions to emphasize their sayings. The attempt to embellish plain truth with indelicate or profane words is like daubing the Venus de Milo with mud to enhance its beauty. All such exaggeration of language is only a veil to conceal ignorance. Only callow youth and thoughtless adults resort to such accessories of language; the wise man, never.

In spite of the many cheats the business world of to-day is founded on accuracy and honesty and faith in man. It must of necessity be so. So much of the business is done on trust that a business man must avoid the man who lies and cheats as he would the plague. There is no solid and enduring business reputation that is not built upon public confidence. It is as true to-day as ever in the world's history that "Honesty is the best policy." Therefore, the second thing I would name as essential to success is:

Honesty and accuracy in word and deed in all business and social relations.

We feel that the various activities of life never crowded each other so fast as they do to-day. A man's business life moves more rapidly and covers a wider field than ever before. Distance to the busy man of affairs should be measured by hours and not by miles. If he can travel in one hour as far as his grandfather traveled in twenty-four hours, then is he able to reach as many more people and things as are measured by the difference between the area of a circle with a radius of twenty-four and that of a circle with a radius of one. The telephone and the telegraph and the typewriter still farther increase his ability to extend his business and his field of influence. And all this makes new demands on his time and his abilities. A couple of men, one at each end of a telephone

line a thousand miles long, costing five dollars a minute for its use, must of necessity think quickly and decide Two men reach their desks in the morning with a hundred things before them for their day's work. One closes his desk at a seasonable hour in the afternoon with the hundred things disposed of and is ready for the work of the next day. The other leaves his desk with a large proportion of the hundred things still there and to be added to his pile for the next day. The one has done his work leisurely, methodically, and easily. The other has been hurried and worried and wearied. secret of success in all this lies in the ability to concentrate one's mind on one thing, keep it there until a conclusion is reached, then make the decision, put that thing behind and take up the next. Only in this way can one's work get on and be done successfully. I believe in the end it would be less harmful to decide twenty-five of the hundred things wrong than to fail to reach a decision on most of them at the proper time. Other things being equal, the men who are sought for to-day for positions of trust and responsibility where salaries are satisfying are the men capable of concentrated thought and prompt decision. And the third thing I advocate is:

Learn to concentrate your thoughts on one thing and reach a prompt decision.

It is strange, but none the less true, that the knowledge the average man lacks most is the knowledge of himself. You remember the Autocrat's designation of the three Johns.

First, the real John.

Second, John's ideal John.

Third, John known to his friends.

Rarely are these three or any two the same. And yet I believe it should be the young man's ideal and constant aim to discover "The Real John," and make that such as he would be willing and proud to exhibit to his friends on all occasions. This also is important in the struggle for success.

A young man who attempts a task he is not fitted for. and who fails, has had a blow dealt to his self respect and his reputation that is sometimes fatal to his future success. and is always serious. One of the most common types of applicants for positions that come to the average employer is the incompetent man who thinks he can do anything or everything, but who has been specially trained in nothing. Lucky for both if they part company then and there. Another type, not so common, is the young man who has been well educated and specially trained, but who disdains the lower rounds of the ladder by which he would gain necessary experience and could rapidly mount, and seeks to vault at once into the highest and most lucrative positions. Better for that young man if he can have a few years training in lower positions. And therefore the fourth thing I advise is:

Know yourself and your own capabilities.

It has been truly said that most Americans believe they have been born to great things. I have no doubt there are several within the sound of my voice who expect to be President of the United States, and still more who expect to be governors of states, generals of our army, and admirals of our new navy. All such high ideals are good and praiseworthy, provided they do not take your interest and attention away from the work in hand. It is well for us all occasionally to look beyond our little horizon and get a glimpse of what our neighbor is doing in the next field, in the next state, or in the far off land, providing we do not lose our interest in the "Day's Work" that is ours to do.

A story is told of a certain noted and successful Boston merchant whose only son had just finished his course at Harvard. The merchant had spent much thought upon choosing a career for his son without reaching a decision. His own business had become somewhat humdrum and tiresome, and he wanted something better for his son. Finally the bright thought came to him to write to a dozen or more of his business friends for advice. They all replied, and all

gave advice. But what struck him most forcibly in their replies was that not one had advised him to put his son into the business the writer was then following. And then a great light came to him, such as he had never seen before, and he knew that happiness and success lie not so much in the work a man has to do as in the man himself, and in the heart and the soul he puts into his work. He decided straightway that his son should succeed to his own business, and that he would teach him the road to success and happiness through honor, and industry, and fidelity. I am afraid this story illustrates one of the prevailing weaknesses of human character, in that we are prone to believe that our neighbor has drawn the golden prize. It is only when we have succeeded, after much effort, in wresting it from him that we find it is only plain metal like our own. And then, if we are wise, a great light breaks upon us, and we find that our prize can be made gold, if we will only put into the winning of it the gold of honor, and integrity, and fidelity to duty, and to the work that has been given to us to do. The "Day's Work" that may come to me is not the "Day's Work" that may come to you, but I would have you all know that happiness and honor and success lie not in the work, but do lie within you and within me and in the spirit we put into our work, and may be had for the seeking. And so the fifth and last thing I give you,—and if I could, I would print it on the walls of your rooms in letters of gold,—is this:

Love your work. Be faithful over a few things and you will be made rulers over many.

## THE NEW STAR IN PERSEUS.\*

By W. W. CAMPBELL.

The dawn of the twentieth century is marked by several astronomical events of the first importance. A prediction as to what the closing years of the century will record would probably fall far short of the truth.

No celestial object of recent times has attracted more attention from the astronomical world than the new star in the constellation Perseus. It was discovered by Rev. T. D. Anderson, a private astronomer in Edinburgh, on the morning of February 22, 1901. At that time it was of the 2.7 magnitude; that is, about half a magnitude fainter than the Pole Star.

Information concerning the discovery was at once distributed by telegraph and cable throughout the world. The resources of all the observatories were immediately brought to bear upon the stranger, in so far as they promised to furnish us with information concerning it.

A fact of great interest was promptly announced by Professor Pickering, Director of Harvard College Observatory. Photographs of this region of the sky had been secured, in the course of their regular surveys, on February 2, 6, 8, 18, and 19, none of which recorded a star in the position of the Nova, though the plate of the last date contained images as faint as the eleventh magnitude. The Nova thus increased from fainter than the 11th magnitude to 2.7 magnitude in less than two and one-dalf days.

<sup>\*</sup>The details of the Lick Observatory observations of the star and nebula are contained in the Observatory Bulletins No. 8 and No. 10.

The weather at Mt. Hamilton had been stormy, and our first opportunity for securing observations occurred on the forenoon of February 24. The circles of the 12-inch telescope were set to the proper readings, and the star was at once found, in broad daylight. Comparison of the brightness of the Nova with that of Capella showed that the former was half a magnitude the brighter. Capella is more brilliant than the average first magnitude star, and the Nova could safely be said to be of zero magnitude. In four days the new star had increased from the 11th to the zero magnitude, and had become the brightest star in the Northern Hemisphere of the sky. The intensity of its light had multiplied fully 25,000-fold.

As an illustration of the manner in which the oldest of the sciences is advancing by leaps and bounds, it may be said that from 134 B.C. to 1876 A.D. only seventeen new stars are on record; whereas in the sixteen years since 1885 nine new stars have been discovered. Photography is largely entitled to the credit of this remarkable showing.

A systematic study of the new star in Perseus was promptly undertaken by the members of our staff, making use of practically all of our instrumental equipment.

It is not expedient to describe the results of our work in detail. Only the more salient features will be referred to.

Meridian circle observations made in February and March, compared with similar observations made this fall, have fixed the position of the new star in the sky very accurately, and have shown that its lateral motion in three-fourths of a year has been inappreciable. Micrometer observations with the 36-inch equatorial have led to the same conclusions. A final statement of the distance of the new star from the solar system cannot now be made, as observations for this purpose must be continued for at least a year, in order to eliminate the effects of other elements entering into the problem. But it can safely be said that the new star is much farther away than the nearest dozen fixed stars, and it is probably as far away as the average

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star. This fact is of great interest in connection with our most recent discovery concerning the Nova, to be described in the sequel.

The brightness of the new star has been carefully estimated, as frequently as necessary, since its discovery in February. Originally the brightest star in the northern sky, it is now invisible to all but the keenest eyesight on the best nights. It is a little brighter than the seventh magnitude stars. This decline has not been uniform. In the spring months it appeared to pass through a cycle of variations once in about five or six days, its maxima differing about 1.5 magnitudes from its minima; but the tendency was downward. Since the first of July there has been but little change. If we may judge by the history of preceding new stars, we shall expect this one to decline slowly, until in the course of a few years it will be visible only in the larger telescopes.

The spectroscopic observations secured with the 36-inch refractor were unusually fruitful, but it should be said that they are largely of a technical nature. One of the first results was afforded by the Mills Spectrograph. atmosphere of the new star was found to contain, among other elements, sodium and calcium vapors. These vapors introduced fine absorption lines in the spectrum. From delicate measurements of the positions of these lines we learned that the new star was receding from the solar system with a speed of about four miles per second. observations, combined with those secured with the Meridian Circle and micrometer, were sufficient to prove that the new star had not come in from other regions, but that its material had existed in its present position for indefinite ages past The spectroscopic observations showed that the conditions in the new star were rapidly undergoing change. The spectrum was at first almost entirely continuous, with here and there a dark line. In two or three days broad spectrum bands were developed, affording evidence that the atmosphere of the star was relatively very extensive, and very highly heated. The extraordinary breadth of these bands left no doubt that the atmosphere of the star was violently disturbed, though the observations gave no decisive clue as to the cause of the disturbance. The character of the spectrum as a whole changed from month to month. Its earlier features were rapidly passing away, and new ones developed. The last observations secured in the spring, just before this constellation was hidden from view by the advancing sun, showed that the hydrogen lines were rapidly predominating. The southern latitude of the Lick observatory made it necessary for us to discontinue observations from May to early in July. In the latter month, as soon as the sun had passed this region of the sky, the spectroscopic observations established that while the Nova retained its stellar point-like form in the telescope, yet the spectrum was that of a nebula, the bright lines occupying the same positions as the lines in the spectra of the wellknown nebulae, but the great breadth of the Nova's lines was proof that the gases composing the nebula were still in a highly disturbed state.

It is hoped that the great observatories of Northern Europe took advantage of their high latitudes to secure a practically continuous series of observations covering the important period of transition from star to nebula; but thus far no results have been announced by them.

We had anticipated that the change to a nebula would occur sooner or later, as this was the transformation through which the preceding half-dozen new stars had passed.

The next items of interest relate to the surroundings of the Nova. A long-exposure photograph of this region was obtained by Professor Max Wolf of Heidelberg on August 32. A careful examination of his plate showed the existence of a faint mass of nebulosity about six minutes of arc south of the star. As this was recorded on two plates, no doubt remained as to its character.

On September 20 Mr. Ritchey of the Yerkes Observatory

was led by Wolf's discovery to secure a photograph with his more efficient instrument. The existence of Wolf's nebula was confirmed, and the nebulous mass was shown to extend throughout a considerable area, the new star being situated near the middle of the mass. The nebulous cloud was not of uniform intensity, but included many nuclei and slender wisps.

A photograph of the same region was obtained with the Crossley Reflector of the Lick Observatory on the nights of November 7 and 8 by Assistant Astronomer C. D. Perrine, the total exposure on both nights being 7 hours and 19 The plate was developed on the following day. and a comparison of Perrine's photograph with the Yerkes photograph taken seven weeks earlier led at once to an extraordinary discovery. The principal features shown by the earlier photograph still existed, but their positions with reference to the new star had changed enormously. A cursory examination was sufficient to show that three at least, and possibly four or more, of the nuclei had moved to the south and southeast about a minute and a half of arc in the seven weeks. The amount of the motion was almost incredible, being no less than at the rate of eleven minutes of arc per year. The greatest similar displacement in the stellar universe previously known is less than nine seconds of are per annum, -only one seventy-fifth part of the motion observed in the nebula.

However, there could be no doubt of the reality of Mr. Perrine's discovery, and I immediately announced it telegraphically to Harvard College Observatory, which is the central station for the distribution of astronomical telegrams both in this country and abroad. My telegram was sent out on the morning of the 10th of November. On the evening of the 11th the following dispatch was received: "Ritchey states a photograph taken at Yerkes Observatory on November 9 confirms the motion of nebula near Nova Persei."

Additional confirmation was also furnished a few days

later by a photograph taken at the Goodsell University, in Minnesota.

Mr. Perrine's discovery, as was anticipated, has aroused intense interest throughout the astronomical profession. It occasioned great surprise in all quarters, but it is a pleasure to say that the reality of the discovery was not questioned by any one. Additional photographs secured by Mr. Perrine in the first half of December offer further confirmation of the facts, and show that many other interesting changes are occurring. Masses of nebulosity not formerly seen were recorded on the later plates.

It is perhaps too soon to say just what bearing this discovery will have upon the explanation of the phenomena connected with new stars; but it is certain that we have witnessed the formation of a nebula. It is likewise morally certain that the new star and the nebula have had a common origin. No definite statement can be made as to the causes which called these objects into visible existence. myself, I have no doubt that they are the products of a catastrophe. The most satisfactory theory of the origin of the Nova is that it is the result of the collision of two dark bodies. The average speed of the stars in their motion through space is between twenty and thirty miles per second. Recent observations here have shown that dark, invisible bodies are very plentiful, and therefore that collisions are not impossible. If we suppose that two such bodies, rushing through space with a relative speed of forty to sixty miles per second, were to collide, we cannot avoid the conclusion that the materials composing them would be transformed from the solid state into that of incandescent gases. There is no doubt that the product of such a collision would be heat; and it requires but a simple computation to prove that the kinetic energy of the rapidly moving bodies, transformed into heat, would be sufficient to convert the materials into highly heated vapors.

While the hypothesis just described accounts very satisfactorily for the observed phenomena, we cannot say that it is an established fact, as we may find that hypotheses advanced later will be even better adapted.

I have spoken above of our determination of the distance of the Nova from us. It is probably no closer than the average star. On this supposition, the angular speed of eleven minutes per annum in the nebula corresponds to a linear speed of some ten thousand miles per second. A question has arisen as to whether this is a real movement of the material in the nebula, or whether it represents merely an impulse or transfer of energy, illustrated by the modern undulatory theory of light. It seems to me that we are dealing with an actual transfer of the substance composing the nebula. Two of the well-defined nebulous masses have moved more than two minutes of arc in the past two and one-half months, and their form remains practically unchanged.

This enormous speed is incomprehensible, but it must not be objected to on that account. The astronomer is constantly dealing with velocities, masses, temperatures, etc., which are as incomprehensible to him as they are to the layman. Our earth is revolving in its orbit with a speed of nineteen miles a second; the sun and its planets,that is, the solar system, - are travelling through space twelve and one-half miles a second, as recently determined from observations made with the Mills Spectrograph. average speed of the stars observed with the spectrograph is more than twenty miles a second, and we have observed some individual stars with velocities greater than sixty miles per second. The vapors forming the prominences at the edge of the sun have been observed to travel more than two hundred and fifty miles a second. All of these are incomprehensible to the human mind, and yet they occur under normal conditions. Now, in the case of the new star, we are dealing with the result of a catastrophe, such as a collision between two massive bodies. No one would be willing to set a limit to the velocities which might be developed as the result of such a collision.

# THE CRITERIA OF HEREDITY\*

By W. C. BLASDALE.

Investigations which attempt to throw light upon the problems of heredity, and the same remark applies to all branches of scientific inquiry, ultimately rest upon a comparison. The mutual relations of parent and offspring, as exhibited in the characters they possess, when correlated for a large number of cases, should ultimately lead to the recognition of general laws, expressing and perhaps explaining the entire phenomena. The facts thus far accumulated, however, do not readily lend themselves to any simple process of correlation and for the most part appear to be self-contradictory. Like certainly produces like, and yet it never does so absolutely, often in the most general sense only. Variation and divergence are not less the rule than is heredity itself.

Various methods have been employed in attacking the problem thus presented. The attempt has been made to determine by direct comparison of a given form with its antecedents the point of origin of the characters it possesses. This process in all cases meets with a large measure of success, since in their general features all organisms resemble their parents or immediate ancestors; yet after having eliminated all those characters which can be traced to a previous generation, there always remains a residuum of

<sup>\*</sup>A paper prepared for a meeting of the Botanical Seminar, held March 19, 1901, and revised for publication.

characters, which cannot be thus disposed of. The reason why all characters are not transmitted without change, and therefore the resemblance between parent and offspring is not absolute, may be assigned to three causes; either these characters are purely superficial and have not impressed themselves on the organism as a whole; or there is a mutual incompatibility of the characters of the parents concerned; or finally, the conditions under which the parents and offspring matured have materially altered the course of development, either preventing the recurrence of certain characters or possibly introducing a number of new ones.

On the basis of these conceptions two groups of theories have developed. The Preformationists have attempted to solve the problem of heredity by attributing to certain particles of matter residing within the organism the property of conditioning its entire development; these particles are capable of being directly transmitted from one generation to another, but where union of two organisms is effected through a sexual process a struggle for supremacy of the particles concerned may eliminate certain ones entirely or may give rise to others possessing entirely new properties. The theory also admits that external conditions may modify development to a limited degree, but postulates that such modifications are purely superficial and are not capable of being transmitted.

The Epigenisists, on the other hand, make no attempt to explain the mechanism by which characters are transmitted, but merely attribute to the cell-plasm certain general features, which tend to produce development along fixed lines, which, however, are capable of being profoundly influenced by the surrounding conditions; they fall short of explaining why the general features of a series of genetically related organisms are so fairly uniform. The one group of theories emphasizes resemblances, the other variations.

Viewing the facts presented by the phenomena of life as a whole, one can scarcely escape the convictions that there is truth in both groups of theories. If the developmental theory is of any practical significance, it must be admitted that all the vast variety of plant and animal forms now known are but the resultant of the differential action of varying conditions of environment upon a comparatively limited number of forms. The blending or fusion of characters through sexual union scarcely explains variation, since the latter attains its maximum in certain groups (the Agaricini for instance) where this method of reproduction is unknown. On the other hand, the remarkable stability of all groups of organisms in their general features, even under varying conditions, i.e., the fundamental fact of heredity itself, demands a lucid explanation.

As a second method of attacking this problem, the question might be asked what characters are transmitted without change? Is it possible to divide all the well recognized characters into two groups, one of which unites all those features which are normally transmitted in a great variety of organisms, the others those that are peculiarly subject to change? If such a classification were possible, a study of the peculiarities of the characters represented in the two groups might give us a clew to the mechanism by which they are transmitted and thus to a satisfactory theory of heredity. The data at present available are scarcely sufficient to make a satisfactory test of this method, since our knowledge relates largely to a limited number of characters only. In a general way, we recognize the fact that certain characters are more frequently transmitted without change than others. We also recognize the fact that certain characters are more subject to variation under varying conditions than others and hence we distinguish between those which are relatively stable and those which are plastic. The former group would offer the better criteria from which to study heredity, since in these characters one element of uncertainty is reduced to a minimum. It is to be noted. however, that the persistence of a character from one generation to another is not sufficient proof of its being heredity, (using that word in its narrower sense) since this may result merely from a continuation of a similar set of conditions. If it could be shown that characters of the more plastic group were transmitted under conditions not favorable to their preservation, this would form the clearest and most definite proof of the existence of a potent heredity influence. On the other hand, the plastic group of characters offer the most satisfactory criteria from which to study variation, and the subjects of heredity and variation are so intimately associated, (since no experimental work can be carried on without considering the question of environment), that it is impossible to study one independently of the other. What is clearly needed is to make our exerimental methods comprehensive enough, and yet sufficently exacting, to enable us to recognize all the cases in which a character, whatever its nature, is reproduced in the offspring as the direct result of parental influence and secondly to recognize those instances in which changes have been effected in the characters of the offspring as the direct result of external conditions.

Hence it is evident that both classes if characters should be employed in the study of heredity if our knowledge of the subject is to be in any sense complete and if we are to avoid erroneous conclusions.

In view of these facts, the question might be raised whether our present methods of study are sufficiently comprehensive. A complete study of any living form, however simple in organization, would lead to the recognition of a long array of characters from any one of which comparison with any other organism might be instituted. Many of these, such as form, size, and color, are easily observed, others, such as the arrangement of organs and finer structure could be determined only by the use of the scalpel and microscope, others by use of the methods of the chemist and physicist, and still others by observing the behavior of the organisms under varying conditions. We might compare parent with offspring from the standpoint of form, of

chemical composition, of the functions it performs or of its reaction towards environment. To make the comparison from any of these standpoints exclusively would clearly be insufficient, to make it from all would be preferable, though perhaps unnecessary, owing to the mutual interdependence of these characters.

Thus far morphological criteria have been most largely used in the study of heredity. It is well known, however, that morphological characters are peculiarly subject to variation, and changes in form have been effected by such agencies as change of food supply or exposure to light, presence of parasites or gall-producing insects, mutilation, etc. Hence the repetition of like morphological features in a series of individuals is not sufficient evidence of heredity unless this repetition is maintained under conditions known to be unfavorable to the perpetuation of the characters concerned. Furthermore, they may fail to indicate the more important general tendencies which are characteristic of the organism as a whole.

Physiological criteria, using the word in its most comprehensive sense, should more nearly represent the constitutional or essential features of an organism, since they stand for causes and not merely for effects. Form is dependent upon function rather than function upon form, yet form is not a perfect exponent of function, since several forms may serve equally well a given function, and even if they do not do so, the process of change may be a slow one and the change of form may lag behind the change of function. Whatever theory we adopt as to the means by which heredity is effected, it seems plausible to suppose that those characters, which are more deeply impressed upon the organism as a whole, would exercise a stronger influence on its sexual organs, (and hence bring about recurrence of these characters in succeeding individuals), than those which affect a portion of the organism only. Physiological characters belong to the former category, they are fundamental, whereas morphological characters may

purely superficial. Heredity and variation are themselves physiological processes and the attempt to study one physiological feature of an organism independently of its other physiological features, or to study a physiological process by observing changes in form only, is clearly insufficient.

Two reasons may be assigned for the neglect of physiological data in the study of heredity. The greater difficulty of making physiological observations is at once suggested. If we consider the more recondite physiological processes, such as those relating to assimilation and metabolism, this objection must be admitted to be a valid one, though even here the difficulties are by no means insurmountable and the end in view is of sufficient importance to warrant the effort required. Many of the more obvious physiological distinctions, such as color, odor, habitat, association with other organisms, are as easily observed as the morphological ones.

The second objection to the use of physiological data is based upon the idea that they are more variable, but this is by no means proven. That many physiological characters are exceedingly variable must be admitted: color and odor, for instance, are remarkably so, and early in the history of systematic botany Linnæus enunciated it as a formal principle that they were not to be trusted even as specific characters. Some of the other physiological characters, in so far as data are available, exhibit a high degree of stability. The sugar content of the beet furnishes an instance of this sort. By tabulating the data obtained from a vast number of analyses made in Holland sugar factories, it was shown that the sugar content forms a normal variation curve of about the same form as those obtained by tabulating statistics of the most stable morphological characters. Just as among morphological characters we have some that are stable and many that are plastic, so of the physiological characters some are stable and others are variable. A comparison of the relative stability of the two groups of characters, in the present state of our knowledge, would be manifestly incomplete, yet may nevertheless present facts of interest. Of the more stable morphological group we might instance such characters as the number of cotyledons, the number of divisions and adhesion of the floral envelopes none of which are entirely free from variation. These characters are among the most stable morphological ones we know, and they are of fundamental importance in systematic botany, yet marked variations are not only produced by slight changes in external conditions but are not rare in nature. We might contrast with this group some of the physiological characters which are also of importance from a systematic point of view. The chlorophyllic function, for instance, as characteristic of the higher plants offer only a few exceptions, and these are accompanied by a deep-rooted change in the habit of life; similarly the geotropic reaction of roots, the phenomena of circummutation, the direction of twining assumed by twining plants are examples of physiological characters to which exceptions are almost unknown. As a means of distinguishing between the larger group of organisms, plants from animals, algae from fungi, the physiological distinctions are more satisfactory than morphological ones. Finally, as a means of distinguishing species among the lower forms, bacteria and schizomycetes, physiological characters have been found to be entirely satisfactory, and this, together with many other observations of a like nature, has brought forth the prediction\* that as the science of botany progresses "physiological characters will assume even a greater importance than at present in the characterization of species," and another authority has admitted the insufficiency of morphological characters as an expression of plant affinities. On the other hand, the plastic characters of the physiological group are more subject to variation

<sup>\*</sup>From an address by W. G. Farlow before the American Association for the Advancement of Science, August, 1898.

<sup>†</sup>Greene, Pittonia, 1, 294.

than these of the morphological group. Such features as the amount of metabolism, and rate of growth, vary from hour to hour. Dantee has compared an organism to an eddy in a stream, which remains constant only so long as the forces which produce it are constant, a conception which clearly relates to processes or tendencies rather than to forms. Other physiological characters, such as longevity, length of time required for development of flower or fruit, are certainly influenced by conditions of environment. The contrast between the stable and plastic characters appears to be more striking in the physiological than in the morphological group.

Some striking illustrations of the correlation between physiological and morphological characters are worthy of Instances are not rare in which the latter are correlated with reference to a single physiological character. The genera Diona and Muscipula are distinguished by the fact that both possess adaptations enabling them to capture and digest insects. Most of the important characters of these genera represent adaptations to this one feature, and the essential or constitutional features of these plants clearly center around this fact also. It so happens that the morphological modifications which accompany this peculiar function are essentially the same in the two genera, and hence systematists have placed them in the same group, though not without protest, because of the fact that their floral structures show some rather marked differences. Is not the physiological character here represented of more significance in expressing the constitutional features of the plant than are the morphological features by which this function is executed? Likewise the peculiar floral characters of the family of Orchidacea center around a physiological distinction, i.e., an adaptatian to cross fertilization; the twisted ovary, monstrous perianth, and peculiar pollen cells are all expressions of the same peculiarity.

In view of the above statements, it would seem desirable to study the facts already accumulated, and to extend these by still further experiments along two distinct lines. First, the effort should be made to establish the limits of variation of a large number of characters both stable and plastic, both morphological and physiological, by means of experiments involving change of environment; second, to determine to what extent such characters are transmitted under conditions both favorable and unfavorable to their repetition.

The importance of physiological criteria having been established, we might next inquire as to what physiological characters, out of the vast number available for the purpose, appear to offer the most valuable opportunities for acquiring facts of real significance with the least expenditure of effort. Without attempting to disparage the importance of morphological characters, or of certain physiological ones already largely utilized, the following suggestions are offered.

The question of chemical composition of organisms as a character for the recognition of heredity appears to have received little attention, yet it is clearly a fundamental and comprehensive one, for it is only through a study of the chemical changes in an organism that we are able to recognize many physiological processes. Also, chemical composition forms the basis of certain physiological characters which can be recognized by our sense of taste and smell. The metabolic and assimilative processes in the higher plants are for the most part the same. In all instances essentially the same substances are used, and these are finally elaborated as fats, proteids, and carbohy-The relative amounts of these groups of substances vary greatly in different plants, as may be seen by examining the data for almost any series of analyses representing the composition of some plant product grown under varying conditions. Clearly it is a fundamental difference which is expressed by the fact that the Gramineæ store their seeds with starch, while the Juglandacea and Coniferea store theirs with fats and proteids. Frequently also, the exact compound represented in each group are characteristic. The species of *Linum* synthesize large amounts of the glycerides of linoleic acid, while the peanut synthesizes the glycerides of arachidic and hypogaeic acids, and the castorbean those of the rare ricinoleic acid.

Striking examples which illustrate the effect of external conditions on the composition of an organism are not rare. An instance of this sort recently arose in connection with the beet-sugar industry of California, where during a season of exceptional dryness the beets developed pectin in such quantities as to materially interfere with the separation of the sugar, a difficulty which did not appear during subsequent seasons. Another illustration might be taken from the wheat industry. The only varieties of wheat which are here found to be successful are the soft white winter wheats, which are relatively high in starch and low in protein, and the introduction of the more highly nitrogenous varieties of the North and East fails to remedy the difficulty, since in a few years they all revert to more highly amylaceous forms, apparently as the direct result of the soil and climate. On the other hand, there is abundant evidence to show that the chemical features characteristic of an organism may become permanently fixed. The changes which have been effected in the composition of most of our commonly cultivated food-plants are most conclusive. With these plants the chief aim of the plant-breeder has been to improve their composition rather than their form, since it is upon their ability to furnish wholesome food that the chief value of his efforts depends. It is through selection that such changes as an increase in sugar content of the beet from five to fifteen per cent. has been effected. That changes of environment often affect changes in composition cannot be questioned, and it is also evident that such changes can be maintained and often intensified under favorable conditions. Some experiments carried on at the Illinois Experiment Station,\* having for their object the

<sup>\*</sup> Journal of American Chemical Society, xxi, 1039,

improvement of the varieties of corn, illustrate the case. It was first determined that the composition of all the kernels on the same ear was remarkably uniform. Hence it was possible to select four classes of seeds, characterized by high protein, low protein, high fat, and low fat, respectively. On growing crops from the four classes of seed, all under the same condition, it was found that, though the average of the erop, as regards the particular constituent, did not attain the average of the seed sown, yet the average of the crop obtained from seed of high protein content was notably higher than that obtained from the seed of low protein content, and similar results were obtained from seed of high and low fat content, The experiments have been continued through several seasons, and there is every reason to believe that races of corn characterized by high protein and high fat are being developed. Apparently there is here a tendency for reversion to a fixed mean, yet the results clearly indicate that the chemical features are transmitted.

It is, however, in compounds resulting from destructive metabolic processes that the greatest variety in chemical composition is encountered. To a considerable degree chemical distinctions are at the foundation of the natural system of classification. Among the characters of fundamental importance in designating plant families is the character of the sap, whether acrid, milky, mucilaginous, etc., differences which are essentially chemical in their nature. In some instances we can correlate certain groups of plants with one or with several closely related com-Though the data are very incomplete, it is probable that the entire order *Drupacea* is distinguished by the presence of hydrocyanic acid, the genus Prunus by benzoic aldehyde, similarly all the Crucifera by iso-sulphocyanate compounds, the Conifera by terpenes, the Myrtacea by complex essential oils, the genus Citrus by lymonene and Salix by salicine. Similarly certain groups of alkaloids characterize the Papaveraceae, and others the Cinchonaceae. It frequently happens, however, that the same compound is repeated in several dissimilar groups. The compound coumarin, for instance, has been reported from no less than seventeen different plants, representing ten distinct orders. In many instances it appears in a number of species of the same genus or of related genera, further research would probably show that it is characteristic of the genera *Melilotus*, *Dipteryx*, *Adiantium*, and *Anthoxanthum*. Apparently then, while chemical composition is an important criterion of the general features of a plant and is normally transmitted, it is largely subject to variation.

Essentially the same conclusions are reached by a consideration of certain other characters, color, taste, and odor, either partly or entirely dependent upon chemical composition. That the color character is subject to frequent variation is evinced by the great number and variety of color forms in many cultivated species, most of these forms being unknown in nature; yet these color variations are commonly transmitted without change from one generation to another, provided crossing with dissimilar ones is prevented. Direct connection between the color character and the amount of exposure to light and heat has been traced in many instances, between color and the presence of certain elements in the soil more rarely. A correlation between the color of seed and flower has been established in the case of the cultivated varieties of Lathyrus odoratus, and the species of Mathiola. Instances in which the color characteristic of the flowers of a given species is also prevalent in other organs of the plant are not rare, but I would cite Primula sinensis, Acroclinium roseum, Rhodanthe manglesii, Dianthus barbatus, in all of which the red flowered forms show greater or less amount of red coloring matter in the stems and leaves, the white flowered forms being practically colorless, facts which seem to indicate that the color character is not merely a local phenomena. Finally the color character finds important application as a basis of classification; it is of fundamental importance in the classification of the alga, the subdivisions of the agaricini, and distinguishes accurately between some of the important but difficultly definable groups of the higher plants, Aster from Solidago for instance. Further, there seem to be certain limitations with respect to the extent of color variation in most species. Instances in which species exhibit combinations of red, yellow, and white or blue and white are very numerous, but combinations of red or yellow and blue are exceedingly rare.

The immediate effect of soil and climate upon the production of perfume in plants both qualitatively and quantitatively is established by a large number of observations. Data from the essential oil industry is most conclusive. Though the plant producing the attar of roses may be grown successfully over a wide range of territory, the yield of perfume in most regions is so small as to render its cultivation unprofitable, also the amount of stearoptene or non-odorous solid constituent is known to vary greatly in oil from different localities. Similarly the amount of menthol in Japanese oil of peppermint frequently reaches seventy-five per cent., while most of the American oils do not contain above fifty per cent. English oil of lavender possesses such marked superiority over the French article that it has been sold for ten times the price, though it is possible that in this instance a distinct race of Lavendula angustifolia has been developed through the influence of English climatic conditions; in either case the fact is a significant one. Many instances showing the value of the perfume character as a means of defining species or genera of plants might be cited. The presence of a pronounced odorous principle in Solidago odora is said to readily distinguish that species from all the others of the group, and the peculiar mephitic odor of Navarretia sgarrosa is a never failing criterion. The delicacy of this test and its persistence under varying conditions finds illustration in the cultivated varieties of roses The odor of tea class, derived primarily from R. indica, though representing a considerable range of variatton, is on the whole distinct from that of the hybrid perpetual class, derived principally from R. damascena, and this in turn is very different from the odor of the sweet brier, R. rubiginosa in its various forms.

Utilization of the sense of taste as an aid to the recognition of plant affinities has been suggested \* and some of the instances cited; recognition of the family *Cruciferae* and the genus *Allium*, for instance, seems to be a most valuable criterion. Without doubt this character is subject to the same degree of variation as is found in the color and odor characters, since like them it is essentially dependent upon chemical composition.

As a means of tracing heredity and studying variation all the characters above enumerated appear to offer valuable opportunities. Evidence as to their stability, on the one hand, and their plasticity, on the other, is abundant and conclusive, which only enhances their value as criteria for the purposes named. It is probable that the utilization of the keener sensual perceptions of the lower animals, particularly insects, would in many cases materially augment the value and adaptability of this group of characters. The surprising accuracy with which many insects are able to discriminate between genera and even species in depositing their eggs is suggestive.

After having studied an organism in the passive state, that is with reference to its morphological and chemical characters, it may still be viewed in the light of its reactions. The question of what an organism will do under conditions to which it is not accustomed, to what extent it can withstand these conditions and the methods of adaptation it employs, is a fascinating subject for research, and one which throws into full relief the fundamental features of the organism concerned. From the animal kingdom and from the human race a large amount of data with respect to the effect of the introduction of poisons and to immunity from disease is already available. In the

<sup>\*</sup> Pittonia 11, 41.

vegetable kingdom we have a long series of facts relating to the resistance of species or varieties to frosts, or to insect pests, their adaptibility to hot or cold climates, or to dry or moist ones. The phylloxera insect attacks cultivated varieties of Vitis vinifera to such an extent as to render their successful cultivation in many localities impossible, but by grafting these on the hardier American species of Vitis the difficulty has been largely overcome. The cultivation of sea-island cotton on the islands off the coast of South Carolina was for some time impracticable owing to the tender character of the plant; gradually, however, a race of sufficient hardiness and vigor has been developed to render its culture profitable. The facts seem to indicate that the reactive characters of plants show a great range of adaptability from cases in which certain reactions are common to an entire family to those in which differences characteristic of the individual only can be recognized. Only two of the most significant groups of characters which properly belong here need be mentioned.

The phenomena associated with the process of grafting are of especial significance. All organisms possess certain distinctive features which permit of their union into a single individual in some instances and render this difficult or impossible in others. Presumably a similarity of the structural units of the two organisms is one of the essential conditions of such a combination, but a more important requirement is a similarity of the nutritive processes. The elaborate series of researches recently carried out by Daniell\* have added much to our knowledge of this subject. This investigator finds that though a partial union (graft by approach) of two plants, often of widely divergent natural relationships, is possible in a great variety of cases, true unions, in which one form develops upon another even to the point of fruition, are rather narrowly limited. He concludes that in the orders Rosacea, Crucifereæ and Leguminoseæ the limit of such grafts is confined

<sup>\*</sup> Revue General de Botanique. (1900.)

to genera of the same tribe, with the Solonaceæ and the Umbellifferæ to different tribes, and with the Compositeæ to the sub-family.

The plant known as Pereskia aculeata is one of the few forms of cacti which develops and maintains true leaves during its entire life. It is of a climbing habit and presents other characters which are rare in this group, yet its evident relationship with the Cactaceae is shown by the ease with which Epiphyllum truncatum can be grafted upon it. Facts of this sort are truly indicative of the deep-seated physiological processes which characterize the organism. and should be of especial significance in determining the affinities of plants of mixed parentage or doubtful relationship. Essentially the same observation would apply to pollination. Here also there must be a mutual adaptation of the two sets of generative organs, between the pollen grains and the stigmatic secretion which induces germination, between the form and possible length of the pollen tube and the structure and composition of the ovules. Morphological, chemical and physiological characters are all employed in the correlation; as far as experiments show, this correlation exists only rarely between different genera of the same family, more often between different species of the same genus.

A second line of experimental inquiry, which seems worthy of further development, relates to the connection between host and parasite. Parasitism has thus far been studied largely from the point of view of the parasite. In determining the specific relations of fungi, mycologists are accustomed to use the host-plant inhabited as one of the most important diagnostic features. From his standpoint the characters of the fungus are expressed by the plant that it inhabits, but there is just as much reason to believe that in many cases the fungus also expresses the character of the host-plant. In order that the relation of host and parasite can exist, there must be a certain correlation between the characters of both the organisms concerned. If it be

found that a certain parasite regularly appears on a given host while a closely related plant, under like conditions of infection, never becomes infested, the evidence would seem conclusive that the two plants differ in important particulars.

The study of the rusts and smuts is especially instructive in this connection. In these groups we have a great number of species inhabiting nearly all natural orders of flowering plants, yet the connection between species of host and parasite is very sharply defined. Many correlations exist between certain genera of rusts and certain families which serves as host-plants, or between certain species of rust and certain genera of host-plants. Of sixteen species of Phragmidium all but two doubtful ones (P. ellisii and P. deglaubens) inhabit Rosaceous genera; of the seven species of Gumnosporangium, all but questionable G. quaraniticium inhabit Pomaceous genera in the acidial stage and Coniferous genera in the teleutosporic stage; similarly all the twelve species of Ravenellia are found on Leguminosea, twelve of the thirteen species of Peridermium are found on either Pinus or Abies, and four of the six known species of Chysomyxa inhabit Ericacea. Illustrations of the second kind of correlation are exceedingly numerous, indeed, it is rare that a rust is limited to a single species of a genus.

The fact that there are important exceptions to such correlations does not lessen their significance. Possibly in some instances our standards of generic and specific limitations are at fault; in many cases conditions favorable to natural infection are not met with, and hence unless actual experiment has shown that infection cannot take place, its absence is not conclusive; finally, the adaptability of the parasite concerned must be determined. As in all lines of experimental inquiry, standards must be established before results can be interpreted. Just as in the science of paleontology the range of life of a given species must be determined before we can use it as a means of estimating the age of a given formation, so we must here first establish

through known relations the limits of adaptability of the species to be used in a given experiment.

Experimental work along this line is very meager, but that of Eriksson and Henning in Sweden and of Carleton in the United States on the rusts of cultivated cereals are of especial significance. It has long been known that certain varieties or wheat are rust-proof, i.e., do not become infected with the grass inhabiting species of Puccinia. With the object of determining the limitations of parasitism between certain species of Puccinia and various species and varieties of grasses, the above-named investigators made a long series of culture experiments. The results of these experiments established the fact that, in addition to the previously recognized species of Puccinia, there are certain "form species," nearly or absolutely identical as far as morphological features are concerned, yet definitely limited in their ability to infect certain species of cereals. The significance of these results is that they emphasize the narrowness of the limitations between which parasitism can exist. They therefore suggest a method for detecting physiological or constitutional differences in plants, other than those manifested in their morphological or chemical characteristics. A striking illustration of the value of this method of detecting affinities, taken from the behavior of the cultivated varieties of roses, might be cited. In California all the varieties which retain to a considerable extent the characters of R. Damascena, that is, the hybrid perpetuals and many of the hybrid teas, are more or less subject to the attacks of Phramidium subcorticum, while I have not yet found any of the tea class, derived largely from R. indica, thus affected. Culture experiments would perhaps enable us to determine with the greatest accuracy the relationship of any given variety to the two species named.

## UNIVERSITY RECORD.

By VICTOR HENDERSON.

The native languages of California will soon be spoken by no man, and will endure only on the phonograph cylinders or in the written records now being made, through Mrs. Hearst's liberality, by members of the Department of Anthropology of the University of California.

Time presses. For illustration,—Dr. Alfred L. Kroeber has found on the lower Trinity river two aged men who are the only living beings who can speak Chimariko. Of these, one is too senile to give aid, the other too superstitious. The language will probably die with them.

Four distinct Indian speech communities yielded linguistic and ethnological material to Dr. Kroeber's researches between September 16 and November 11—the Yurok, on the lower Klamath, each of whose settlements was visited, and two of whose ceremonials were witnessed; the Wishosk, about Humboldt bay, whose language and religion persist, but whose old manner of life is lost; the Karok, on the middle course of the Klamath, and the Hupa, on the lower Trinity. During this journey nearly three hundred pieces were obtained for the museum.

The mythology, speech, and life of the Hupas Wailakki, and other Athabascan tribes are the subjects of Mr. Pliny E. Goddard's researches. At the Battie Rancheria, on October 7, he saw a burial, at Round Valley he wrote from an Indian's dictation the texts, in Wailakki, of twetny

myths, and recorded on the phonograph nineteen songs. Mr. Goddard has recently worked out a Konkau vocabulary, and has made ethnological purchases, ethno-botanical collections, and studies of Indian and pioneer tradition.

The antiquity of man in California is being studied under the direction of Professor Frederic W. Putnam of Harvard, chairman of the Advisory Committee, and Professor John C. Merriam. During October, caves along the McCloud were examined by Mr. Herbert W. Furlong. Remains were found of Quaternary mammals, but not of man. The Quaternary beds and the shell heaps around San Francisco bay and San Pablo bay are being examined by Dr. Merriam, Mr. Sinclair, and Mr. Vance C. Osmont in order to determine the age of the oldest California shell heaps made by man, and their relation to late Quaternary beds containing remains of an extinct fauna. Next summer a search for human remains will be made in the auriferous gravels.

Dr. Alfred C. Haddon, F.R.S., University Lecturer and Fellow of Christ's College, Cambridge, Professor of Zoölogy in the Royal College of Science, Dublin, and President of the Anthropological Institute, lectured at the University from November 21 to 27 on "Primitive Peoples—Ethnographical Studies of British New Guinea and Sarawak."

A choice collection of native implements, utensils, weapons, garments, and sacred objects from New Guinea and other islands inhabited by Melanesians, recently purchased for the University by Mrs. Hearst, served to illustrate Dr. Haddon's lectures.

The new fireproof temporary storehouse now contains two hundred and sixty-four cases of materials for the anthropological museum, and some two hundred and fifty cases are in transit. Among the objects recently receeived are ten cases of cliff dwellers' remains, and twenty-one cases containing stone sarcophagi other Etruscan antiquities, an ethnological collection from Alaska, and some Philippine specimens.

#### APPOINTMENT OF DR. SHAW.

The beet sugar industry will be the particular concern of George Wright Shaw, Ph.D., who has been called to the faculty of the College of Agriculture as Assistant Professor. Dr. Shaw resigns the post of Chief Chemist and Agricultural Expert for the Colorado Sugar Manufacturing Company at Grand Junction, Colorado. From 1891 to 1900 he was State Chemist of Oregon, and Professor of Chemistry and Chief Chemist of the Experiment Station of the Oregon State Agricultural College at Corvallis, Oregon, From 1889 to 1891 Dr. Shaw was Professor of Chemistry and Physics at Pacific University, Forest Grove, Oregon, and from 1887 to 1889 he held a similar position in Whitman College, Walla Walla, Washington. He was born in 1864 at Bradford, Vermont, and in 1887 received the degree of A.B. and in 1889 of A.M. from Dartmouth. During his nine years at the Oregon State Agricultural College Dr. Shaw published fifteen bulletins on important agricultural He has been a constant contributor to the agricul-The American Book Company in November published a volume of "Laboratory Exercises in General Chemistry" prepared by Dr. Shaw.

#### DAIRY INSTRUCTION.

Mr. Leroy Anderson, Instructor in Dairy Husbandry, will spend the coming half-year in travelling about the State giving assistance and instruction at dairies, creameries, and cheese factories. A stay of a day or two will usually be sufficient to make suggestions and render assistance in remedying defects in dairy products. Whenever possible, meetings of farmers and dairymen will be arranged at which Mr. Anderson will discuss some of the problems of dairy husbandry. The work will be begun by a month's journey in Southern California.

This is a part of the University's plan of offering practical instruction, according to modern methods, in dairy husbandry. During the past nine weeks thirty-seven

students have been in attendance upon the short course in dairying given at the University.

#### THE PEACH MOTH.

The peach moth, which is causing great injury to orchards in Placer county, is to be studied by the University, and means sought for its extinction. Mr. Warren T. Clarke, an advanced student in agriculture, has been appointed Assistant in Entomology for six months from January 1, 1902. He will go to Newcastle to begin this investigation. Mr. Clarke's bulletin on the potato moth, just issued, is a valuable contribution to knowledge.

#### LEAVES OF ABSENCE.

Professor Edward Bull Clapp, head of the Department of of Greek, has been granted leave of absence for 1902-03. He will spend most of the year in Athens.

Professor M. E. Jaffa will spend the year 1902-03 at Wesleyan in investigations in dietetics under Professor Atwater's direction.

Professor M. W. Haskell will be on leave during 1902-03, and Professor Frederick Slate, head of the Department of Physics, from January to August, 1902.

#### LICK BULLETINS.

The University is publishing a series of Bulletins from the Lick Observatory, in which important results secured at Mount Hamilton may promptly be made available for scientific use.

The Sumatra eclipse expedition, which, through the generosity of Mr. William H. Crocker, secured such valuable results; Astronomer Perrine's remarkable discovery of motion in the nebula of the new star in Perseus, exceeding in swiftness any stellar motion ever before detected, and new observations of double stars by Atronomer Aitken have been the subjects of recent *Bulletins*.

Director W. W. Campbell on November 9 was elected Foreign Associate of the Royal Astronomical Society.

### ENTRANCE REQUIREMENTS.

A further step in the raising of the standards of the Medical Department is the announcement that, beginning with the autumn of 1905, two years of college work will be a requirement for entrance. These two college years must have included successful study of general inorganic and organic chemistry and quantitative analysis, general physics, and physical measurements, general zoölogy, including laboratory work, a year of English composition, and a reading knowledge of French and German.

A uniform list of admission requirements for the Colleges of Letters, Social Sciences, and Natural Sciences was adopted at the meeting of the Academic Council on December 13. The new system is extremely flexible. It affords to California high schools abundant freedom for development on lines of their individual choice. It frees students from the necessity of choosing, while still in the high school, between the three University courses of general culture. The revised admission requirements, which are almost exactly the same as those for Harvard College, are as follows: English, two units; Greek, French, or German, two; Latin, three; History, two; Mathematics, two; Physics, one; elective, three. The total number of units required is now fifteen,—an increase of a half unit. In flexibility there is a great gain.

The new system will go into effect in 1906. From now on, however, any student who wishes may offer as his preparation courses arranged as in the new scheme.

This unification of the admission requirements for the three colleges of general culture was decided upon after over a year's discussion in the Schools' Committee and in the faculty, and after President Wheeler had sought the written advice of all the high school principals of the State.

Under the new system a student may enter the College of Letters who has had no Greek in the high school, and only three instead of four years of Latin. The intrant to the College of Social Sciences may offer either French or German or Elementary Greek, and must offer one year of History besides Civil Government. Both Advanced English and Advanced Latin are made electives. For admission to the College of Natural Sciences the intrant must, according to the new plan, offer three years of Latin, and in addition French or German or Elementary Greek.

Among other noteworthy features of the new system are the addition of Physiography, based on modern naturestudy work, to the list of science subjects; the addition of English History to the group of subjects that may be offered as units in History, and the reduction of the requirement in Mathematics from two and one-half to two units.

For the coming half-year the examiners of schools which seek accrediting will be as follows:

Professor Sanford, Latin and English; Dr. Ferguson, Latin and History; Dr. Noble, Mathematics, Physics, and Chemistry; Professor Schilling, Modern Languages; Professor Clapp, Greek; Professor Kower, Drawing; Professor Setchell, Biology.

#### UNIVERSITY LECTURES.

Robert M. Wenley, Sc.D., D.Phil., Professor of Philosophy in the University of Michigan, has accepted an invitation to deliver the annual address before the Philosophical Union, on August 29, 1902. He will speak on some leading topic connected with Plato's Republic,—for the present year the subject of the Union's study.

Among the speakers for the remaining meetings of the year,—held on the last Friday of each month in room 1 of the Philosophy Building,—will be Mr. George H. Boke, Mr. W. H. Gorrill, Dr. E. C. Moore, Dr. W. P. Montague, Professor George M. Stratton, Mr. H. A. Overstreet, President Wheeler, Professor C. M. Bakewell, Professor Charles Mills Gayley, and Professor George H. Howison.

At the University Meeting on November 8 the speakers were Thomas Addison, M.D., Pacific Coast Manager of the General Electric Company and President of the Sacramento Gas, Electric, and Railroad Company, and President Wheeler. Dr. Addison spoke on "Education," and President Wheeler on the Yale Bicentenary, from which he had that morning returned, and on Theodore Roosevelt as man and President.

At the University meeting on November 22 Dr. Alfred C. Haddon spoke on English University life as exemplified at Cambridge, and Mr. Walter Damrosch, the composer and conductor, on "Music."

Dr. William H. Tolman of New York, Director of the Industrial Betterment Department of the League for Social Service, spoke at Hearst Hall November 14 on "Studies in the Factories and Workshops of the World."

Mr. J. Richard Freud, Secretary of the San Francisco Merchants' Association, spoke for the College of Commerce on November 15 and 19 on "The Civil Service."

#### MRS. HEARST'S RECITALS.

Mrs. Hearst entertained the members of the University at three recitals in Hearst Hall by musicians from the Grau grand opera company. At each concert Hearst Hall held more people than, probably, were ever seated there before. The recitals were most unusual in character, and were deeply enjoyed by the University.

On November 22 Mr. Walter Damrosch lectured, with his own piano illustrations, on Wagner's "Parsifal." November 25 the singers were Madame Ernestine Schumann-Heink and Mr. David Bispham. November 30 Madame Suzanne Adams and Mr. Scotti sang, and Mr. Leo Stern played several 'cello solos. At both concerts the accompanist was Professor Reuss of the Royal Conservatory of Music, Dresden.

Mrs. Hearst has presented to the University a grand piano, to be used for concerts, receptions, and other student gatherings in Hearst Hall.

Another recent gift from Mrs. Hearst is two admirable portraits in oil, of much historical interest, one representing Captain John Augustus Sutter, on whose estate at Coloma gold was discovered in February, 1848, and the other Hon. John B. Felton.

### GIFTS TO THE UNIVERSITY.

Mrs. A. S. Hallidie has presented to the University a choice collection of minerals, and several fine specimens of fossil fish from Green River.

Among other recent gifts are one hundred and fifty specimens of rocks from classical European and American localities, and one hundred and fifty specimens of minerals, presented by Dr. A. S. Eakle, of the Department of Mineralogy; twelve ore-tanks for the Mining Department, presented by the Pacific Tank Company, San Francisco, and several tons of ore, presented by the Nevada Metallurgical works of San Francisco.

#### PRESIDENT ELIOT'S VISIT.

President Charles W. Eliot of Harvard will deliver the Charter Day address on March 23, 1902. President Eliot's visit to the Pacific Coast was undertaken expressly for this purpose, and was not planned until after President Wheeler had invited him to be the Charter Day speaker.

## STUDENT AFFAIRS.

By W. H. DORN.

A local chapter of Sigma Xi, the national scientific honor society, has been founded at this University. Sigma Xi is a scholarship fraternity, analagous to Phi Beta Kappa but confined exclusively to those engaged in scientific work. Membership in the Eastern chapters is granted for marked ability in scientific research rather than for a uniformly high record in class work. It is intended to apply the same test in the local chapter. The charter members are Dr. Eakle, Dr. Morgan, Prof. Setchell, Prof. Jepson, Mr. LeConte, and Dr. Ward. An election of senior and graduate members will be held.

A new honor society entitled Mim Kaph Mim has been formed in the Department of Chemistry. The objects of the organization are to promote chemical research and maintain an interest in chemical work among the members after graduation. Membership is elective, and will be confined to those who have shown a high grade of scholarship and promise of future success.

A Press Club has been organized at the University of California for the purpose of advancing the literary and financial interests of the regular college publications. Membership is elective from among the prominent workers on the *University of California Magazine*, the *Daily Californian*, the *Occident*, and the *Blue and Gold*.

A Law Club has been formed for the purpose of establishing mock courts for practice work in law. Membership is confined to those students of the University taking senior or graduate work in the Department of Jurisprudence.

A debating team from the Hastings College of Law was successful Friday evening, November 20, in winning the sixth annual Hastings-Congress debate. The question was: "Resolved, That the policy of disfranchising the negroes in the South is wise," with the understanding that the word "policy" should not involve the question of constitutionality. Hastings argued on the negative.

With an average weight of eleven pounds less to the man and against the disadvantages of a steady rain and a consequently heavy field, the University of California football team won a splendid victory from Stanford on the afternoon of Saturday, November 9, in the eleventh intercollegiate contest. The score, 2-0, fails to give a true estimate of the relative merits of the work of the two teams. The ball was in Stanford territory most of the time, and twice was California dangerously close to her enemy's goal line. Had it not been for a disastrous fumble on the sevenyard line, California would have scored a touch-down in the first fifteen minutes of play. The Stanford team was completely outclassed both in defensive and offensive playing. The California line held Stanford for down after down and Stanford was forced to yield yard after yard to the lighter California line and backs. The score was due to a touchback made after Overall had broken through the Stanford line and blocked Hill's kick. The team work of California's eleven was excellent, and each individual played with a spirit that has never been equalled by the members of a Pacific Coast team. The line-up was as follows: L.E., Starr and Womble; L.T., Albertson; L.G., Stowe; C., Gendotti; R.G., Overall and Stroud; R.T., Hansen; R.E., Hudson; Q., More; L.H., Mini and Sherman; R.H., Womble and Whipple; F., Duden.

On Saturday, October 19, the Stanford Freshman team defeated the California Freshman team at the Sixteenth and Folsom street grounds, San Francisco. The score was 11 to 5, Stanford making one touch-down with goal and one place kick, California making one touch-down. The two teams were well matched. Both were good on the offensive and both weak on the defensive. Neither team yielded the ball on downs during the game. Stanford's victory was due to a great extent to the playing of their half-back, Tarpey, who in the second half made a touchdown by recovering the ball, which had been blocked when he attempted a place kick, and running with it for a touch-down through a scattered field. In the first half he succeeded in making a beautiful place kick from the thirty-yard line. Toward the end of the second half the California Freshmen seemed to take new life. This was due very much to the entry into the game of Graves, a sub half-back. The latter secured the ball and carried it some seventy-eight yards to a touch-down. From this point on to the end of the game California played the better ball, but was unable to score again.

The following are the scores which California made against the Olympic and Reliance club teams in her games with them:

Saturday, September 28—California, 0; Reliance, 0.
Saturday, October 5—California, 5; Olympie, 0.
Saturday, October 12—California, 6; Reliance, 0.
Saturday, October 26—California, 6; Olympie, 5.

The regular Varsity team with six substitutes will be sent south during the Christmas vacation. This was determined upon at a recent meeting of the Executive Committee of the Associated Students. The team will play the Los Angeles Athletic Club team on Christmas day in Los Angeles, and on the following Saturday will meet the Perris Indians.

Graduate Manager Decoto made his complete annual report at a meeting of the Executive Committee of the Associated Students called for that purpose. This report

shows that athletics for the season brought in \$13,577.20 and cost \$10,543.88; balance \$3,033.32. The receipts of the big game this year were about \$3,250 less than last year. Had they been as large, the balance of this year would have exceeded last year's by \$1,250.

Many rallies attended the closing days of the recent foot-ball season. First there was the "Axe Rally" on the bleachers, November 6, after the foot-ball team's final public practice The "Smoker Rally" followed the next evening in the Gymnasium. This was probably the largest and most enthusiastic gathering ever held at this University for the purpose of encouraging the foot-ball team. A number of graduates spoke, among whom were Wm. R. Davis, Frank Powers, and John R. Glascock. At 11:00 a.m. the Monday following the victory in the intercollegiate match a "Jubilee Rally" was held in front of the Gymnasium. President Wheeler, Colonel Edwards, Coach Simpson, and a number of men of the team made short speeches.

The Women Students tendered a reception to the members of the foot-ball squad in Hearst Hall on the evening of October 31, to which all students were invited. On the evening of Monday, November 11, the Alumni Association of the University gave a banquet to the members of the victorious team, at the rooms of the Merchants' Club, in San Francisco. There were present some fifty alumni, the fourteen members of the team, and a number of the faculty.

The Sophomore crew won from the crews of the other three classes in the semi-annual Class Regatta. This was held on the race course, the start at Sessions Bay, Saturday afternoon, November 23.

The fall training on the track was concluded October 19 by a try-out. Several of the Freshmen made good records. Very few of the old track men took part in the meet, and of those that did only a few entered their regular events.

On the evening of the inter-collegiate foot-ball game,

Monday, November 9, one of Rostand's comedies, "The Fantasticks," was presented in English at the Alhambra Theatre in San Francisco. The cast was composed entirely of University students and was under the direction of Professor Syle. The play was an unqualified success both dramatically and financially.

Friday, November 29, was Junior Day for the Class of 1903. In the afternoon a curtain raiser, "Cave Canem," by J. M. Koford, and a farce, "Wing," by Miss Bertha Janes, were presented at the Macdonough Theatre, Oakland. Both were well received by the friends of the class, who filled all the seats and standing room. The farce was one of the best that has ever been given by a Junior Class. It ranks with "James Wobberts," hitherto the standard. The entire cast of "Wing" seemed particularly well chosen and acquitted itself most commendably. In the evening the Junior Promenade was held in Harmon Gymnasium, and was a social success.

The following report has been made by the Manager of the 1902 Blue and Gold: Cash receipts, \$4,081.88; cash disbursements, \$4,056.08; balance on hand, \$25.80.

Nineteen candidates were initiated into Skull and Keys Wednesday, October 23.

